AMSTRAD COMPUTER USER

95p

September 1985



On Test

Amstrad's RS232C Interface

Cobol for CP/M

Jet Set Willy

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Program Listings

Sabotage - Save the World (Again)

Crazy Legs - Dodge those Lasers

Super-Power Rom Board Reviewed

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REVIEWS

COMPETITIONS

PROGRAMS

AMSTRAD COMPUTER USER

SOFT-5010 Issue 10 September 1985

FEATURES

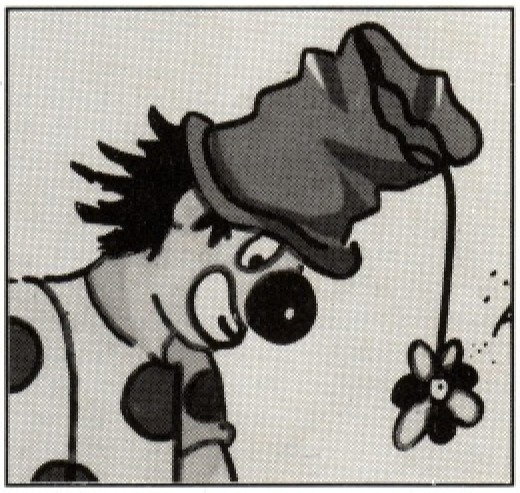
REGULARS

NEXT ISSUE

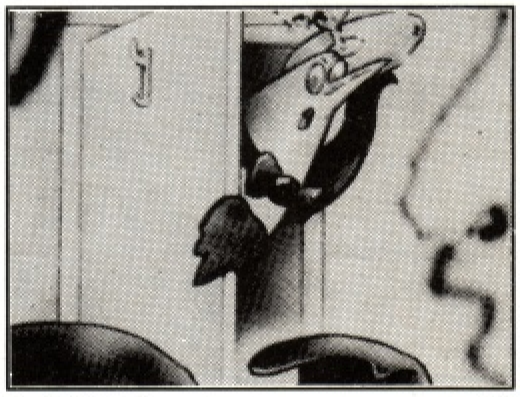
DK Tronics Light Pen *Reviewed*

Magical Landscapes *Masterpieces of Maths*

Competitions *Alligata and Mikro-Gen*









User News...

Stuck in MUD

Many years ago a student at Essex University called Roy Trubshaw wrote an adventure program, like many others this had the usual shipwrecks, dwarves, dragons and a princess. Unlike other adventures the game allowed more than one player to explore the game at once. Two players using different terminals to the same computer (a DEC 10 mainframe) could explore together, join forces to fight the computer generated monsters, talk between themselves and even fight each other. For this reason it was known as a Multi User Dungeon, or MUD for short. Like all good things Roy's course came to an end. He handed the project to Richard Bartle who beefed up the input, the monsters (known as mobiles) and added many more rooms to the game. Something as good as this didn't stay quiet for long, so with the advent of modems, players started logging in from outside Essex University.

The fame of the game spread and soon it will be available to everyone thanks to British Telecom. The new version will cost £2.00 an hour to play and show considerable improvements over the Essex version. All you will need to log in is an Amstrad Computer, an RS232 interface and a modem.

Space, Adventure and Karate from Melbourne House

Three new games from Melbourne House cover a wide spectrum of computer games. Starion is a spectacular 3D space game. Technically brilliant and very playable it involves you flying through space and time to collect a set of letters which can then be unscrambled as the answers to a set of questions. A sort of shoot-em-up multiple choice. The Way of The Exploding Fist is a karate simulation based on an arcade game. This can be played by one player against a very agile computer-based opponent or by two players against each other. Both of these games are due out shortly. Out now is Morton's Quest the sequel to Classic Adventure.



User Clubs

Here is a list of all the user groups we know about. If we have missed you off the list then drop us a line and we will include you as soon as possible.

AMSWEST
Secretary: Mrs P.T. Ardron.
6 Weston Street
Perth
Western Australia
6101

Manchester Amstrad User Club
Contact S.J. Stanner
21 Gatling Ave
Longsight
Manchester 12M12 5SX

Brisbane Amstrad Computer Club
President: Paul Witsen
Unit 6
123 Central Ave
Indooroopilly 4068
Brisbane
Australia

On The Right Tracks

The race is on to win the Grand Prix for racing games. First off was Amsoft's "Grand Prix Driver", however this soon started to lag behind when players realised that this was not a game to be taken seriously. Out ahead at the moment is "Rally II" a game written in France and published by Amsoft, this has the advantage of user-definable tracks and lots of opposing cars to overtake. Coming up fast behind is "3D Grand Prix" Also from the Amsoft stable but with an established pedigree (it's a conversion from the Beeb) and looking to be a strong contender for the future. Not out of the pits yet are "Chicane" from Kempston and "Pole Position" from US Gold. Of the two end markers "Pole Position" looks the most promising, if US Gold do their stuff we should get a review in the next issue. "Chicane" is based on the Kempston racing car but a conversion from the Spectrum is still only a possibility. All the Amsoft games are £8.95, Pole Position will be £9.95. If any other software house is contemplating producing a racing car game they had better get in quick.

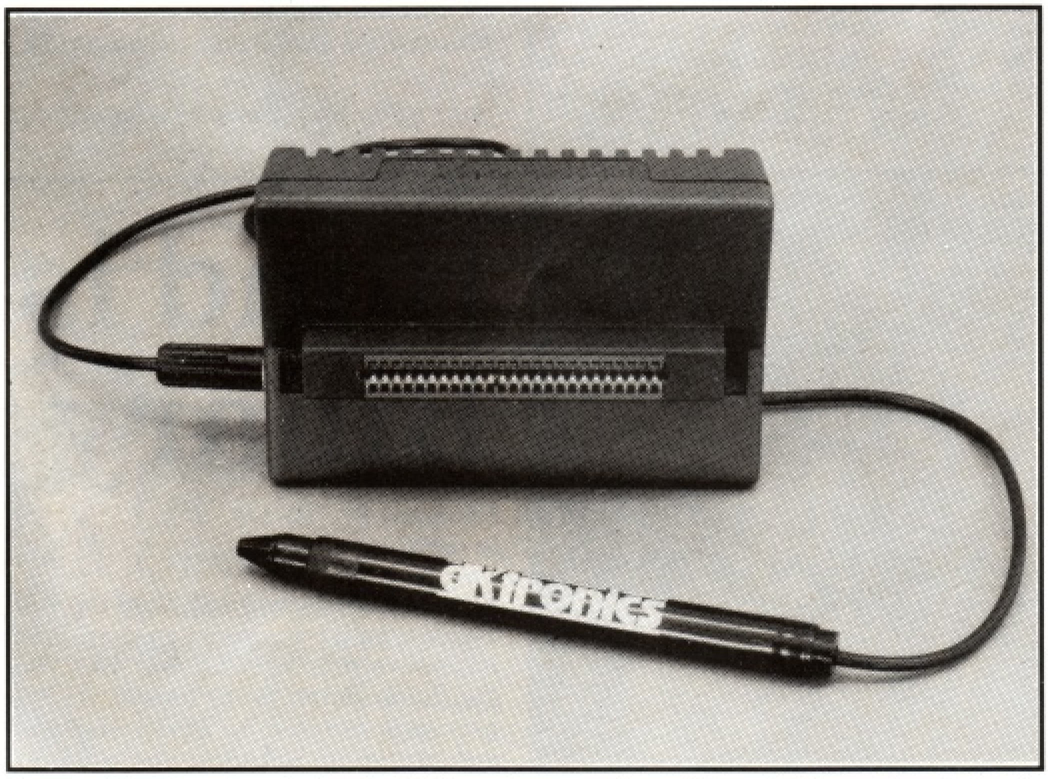
Amsoft Kicks Off



Look out for Glen Hoddle Soccer. The great man has endorsed the latest Amsoft product which will be in the shops soon. Playing the part of eleven men can be a bit tough so you only take the part of the player nearest to the ball, with the computer looking after the rest of the team. You view the pitch from a 'Match of the day' angle with the field of view scrolling up and down, following the ball. In the background an audience cheers. The programming is nearly finished with only a few finishing touches to be put in before it appears in the shops. Glen Hoddle Soccer will cost £8.95 on tape or £12.95 on disc.

For the nicest scrolling you have seen on an Amstrad look out for 3D stunt rider. The action may be very 2D for a 3D program but the rate at which the busses scroll under you is quite impressive. Look out for it soon.

Light Pen from DK'Tronics



Icons and drawing seem to be the in thing at the moment. DK'Tronics have put together some very impressive software for their new light pen. The unit looks a lot like their speech synth and fits on the back of a CPC464. We will have a full review next month but if you can't wait then you can contact DK'Tronics on 0799 26350.

US Gold Programs to be Launched Soon

In the past all the good American software has been written for Commodore and Atari computers. This meant that US Gold released these versions first and then set about a Spectrum version, finally followed by an Amstrad version. Well US Gold are doing their best to catch up and soon hope to to release the latest games. These will include the newly acquired Epyx range. Between now and the begining of next year US Gold plan to release Summer Games II, Winter Games, F.B.I., Impossible Mission, Pitstop II and Breakdance.

Marconi Tracker Ball

The Central Trade Exchange are to launch a combined hardware and software package consisting of the Marconi RB2 tracker ball and an interface for the Amstrad. The RB2



is just like the tracker balls Marconi install in Civil and Military radar systems. The system is fully documented and comes with a colour drawing package. This allows accurate freehand drawing, standard shapes and designs, solid and textured fills (to provide more than 20 colours), nine airbrush patterns, an icon utillity and full printer drivers. We have yet to see how good the software really is but having used the hardware on other computers we know that the RB2 is a great little device. The whole lot sells for £89.50, details from C.T.E Ltd on 0582 61283.

This Joystick has no Base

A recent arrival in the Amstrad Computer User office was a joystick sans base. (That means it didn't have one - Ed). The device is known just as "The stick" and it may not be the first of it's kind but it is very good. Don't try playing anything which needs precise control - you would need a very steady hand to play 'Hard Hat Mac' but for Decathalon -Wow! The fire button is a bit flimsy but the mercury switches inside should never wear. There are four little tubes inside 'The Stick' which contain a quantity of mercury and make contact when you tilt the stick. We know that's how it works because the editor took the thing to bits as soon as we got it. "The Stick" costs £12.99 and is available from Lightwave on 051-639 5050



Had he read the press release properly, however, beforehand he would not have to take it to bits.

"The Stick" with its non-slip grip can cope with even the most fraught moments in any game.

Don't suffer from cramp or a broken shaft again



Bond is Binary

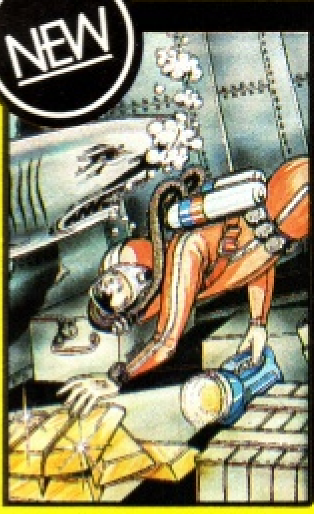
Domark's latest game is "A View to a Kill". This is a multi part arcade game with a very impressive title sequence that even plays the Duran Duran theme tune at you. The game was designed by Tigress Marketing and written by Softstone. You, naturally, play the part of James Bond who has to capture the baddies save the world and stop California from being wiped out (wasn't that the plot of "Superman"? - Ed).

the only choice

Kuma AMSTRAD CPC464 software

No.1 BEST SELLER

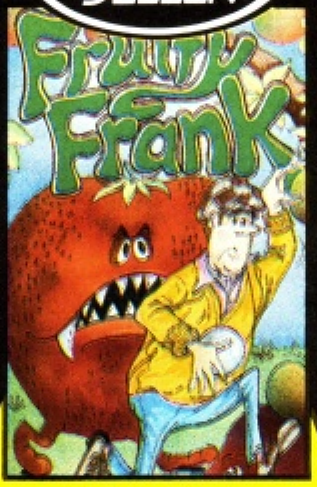
NEW



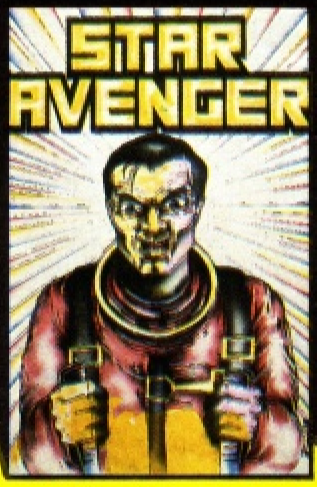
North Sea Bullion



Galaxia

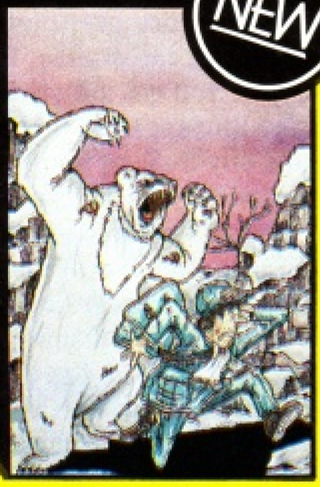


Fruity Frank



Star Avenger

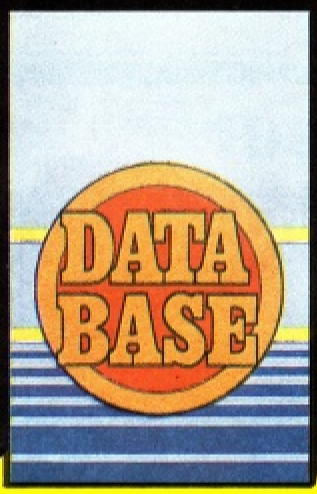
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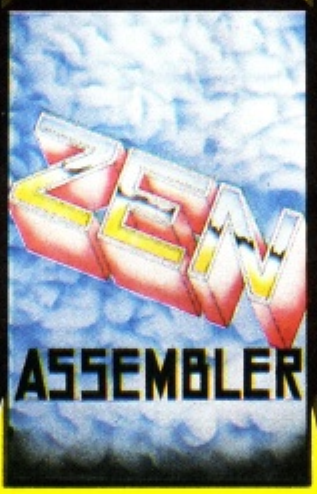
Shadow of the Bear



Home Budget



Database



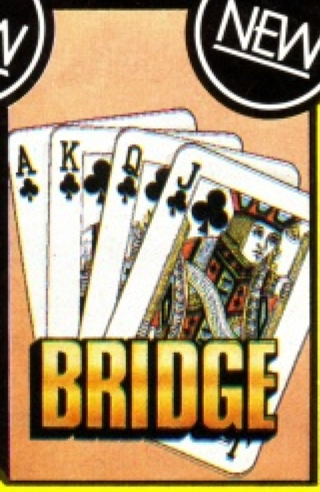
Zen Assembler

NEW



Artwork

NEW



Bridge

• BOOKS

No.1 BEST SELLER

The Amstrad CPC 464 Explored by John Braga

This superb book is designed to let every CPC 464 user, at whatever level, get the most from his computer. After an introductory section on the special Basic features, the book looks in depth at the excellent sound and graphic facilities.

NEW

ZEN and the Amstrad CPC 464 by Ian R. Sinclair

This book covers the CPC 464 itself, a detailed guide to Zen, an introduction to the Z-80, ROM, and RAM, subroutines, screen and keyboard, cassette I/O and how to plan a program. The text is littered with illustrations, diagrams and helpful program examples.

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Who Owns What We Print

On the contents page of this magazine is a line which says © Amstrad and Amsoft. This means that you need to contact us before reproducing anything contained within the magazine. What happens to program listings? Obviously you will want to type them into your computer and save them onto tape or disc. In theory you are breaking our copyright, in practice, however, that is what they are there for and so we are unlikely to complain. You have paid your 95p for the magazine and that is the payment for the right to use the listing. What if you give a tape of a program to a friend? Since there is no way we can check-up on this it would be impossible, and a little unreasonable, for us to expect you not to do this. We can only hope that any one you give the tape to finds the programs so good that they rush out and buy their own copy of the magazine. Some of the listings are very good. Crazy Legs in this issue and Froggie in the July issue are two which spring to mind.

The matter of copyright is complicated further by the use of bits of any program we publish. The writing adventures section which finishes this month is a good example. You are expected to add you own ideas and routines to the code we publish. In this case it is probably best to declare the bits of Basic program as being "Public Domain" that is anyone can take them and do what they like to produce their own programs. If you do want to do this then please declare the source of the routines, a simple line which says "Based on the articles in Amstrad Computer User" would be appreciated.

Some routines are intended for general distribution. Answers to programming enquiries and routine like the one to convert a CPC664 into a CPC464 published in the July issue can be used by anyone who needs them. At least one software house will be using that program to make sure that the tapes they sell will run on the CPC664. In the future such programs will carry a note to this effect.

We Need You

Where do the programs come from? Some of them are written by people inside Amsoft, some come from the £2,000 software competition but most of the programs, and some of the articles are written by the readers of Amstrad Computer User. If you want to submit a program send us a tape or disc and we will look at it and offer you a fee before printing. A sheet is available to anyone who sends a stamped addressed envelope on how to write programs for Amstrad Computer User.

We pay well but because of that we can afford to be fussy. You don't have to be original in a magazine listing but it helps. We look forward to seeing your submissions.

Simon Rockman





At last, it's been released!
Dragontorc of Avalon, the chart-topping Spectrum adventure movie is now available for the Amstrad CPC 464 and CPC 664. The story so far – Evil Morag the Shapeshifter has snatched the crown of Dumnovia, struck from the legendary Dragontorc of Avalon, and now only needs the remaining four to gain total mastery of Saxon Britain.
As Maroc the Mage you must challenge Morag through strife torn kingdoms to reach the crowns first and release Merlyn, your old tutor, from Morag's dark spell. You'll stumble across secret crypts, magic circles of stone and ancient leylines which will be your main route to the crowns. A free map included with the adventure will help you plot your course and a scenario full of clues will prove invaluable in your desperate fight against Morag. But be prepared for Sensory Animation! This programming breakthrough gives lifelike emotions to the many characters you'll meet on your journey. Upset them and any chance you have of reaching the crowns may be dashed forever.

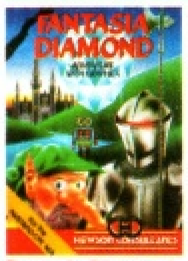




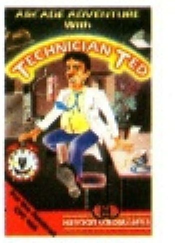
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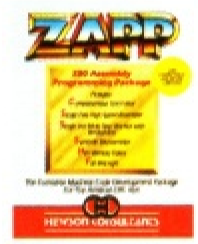
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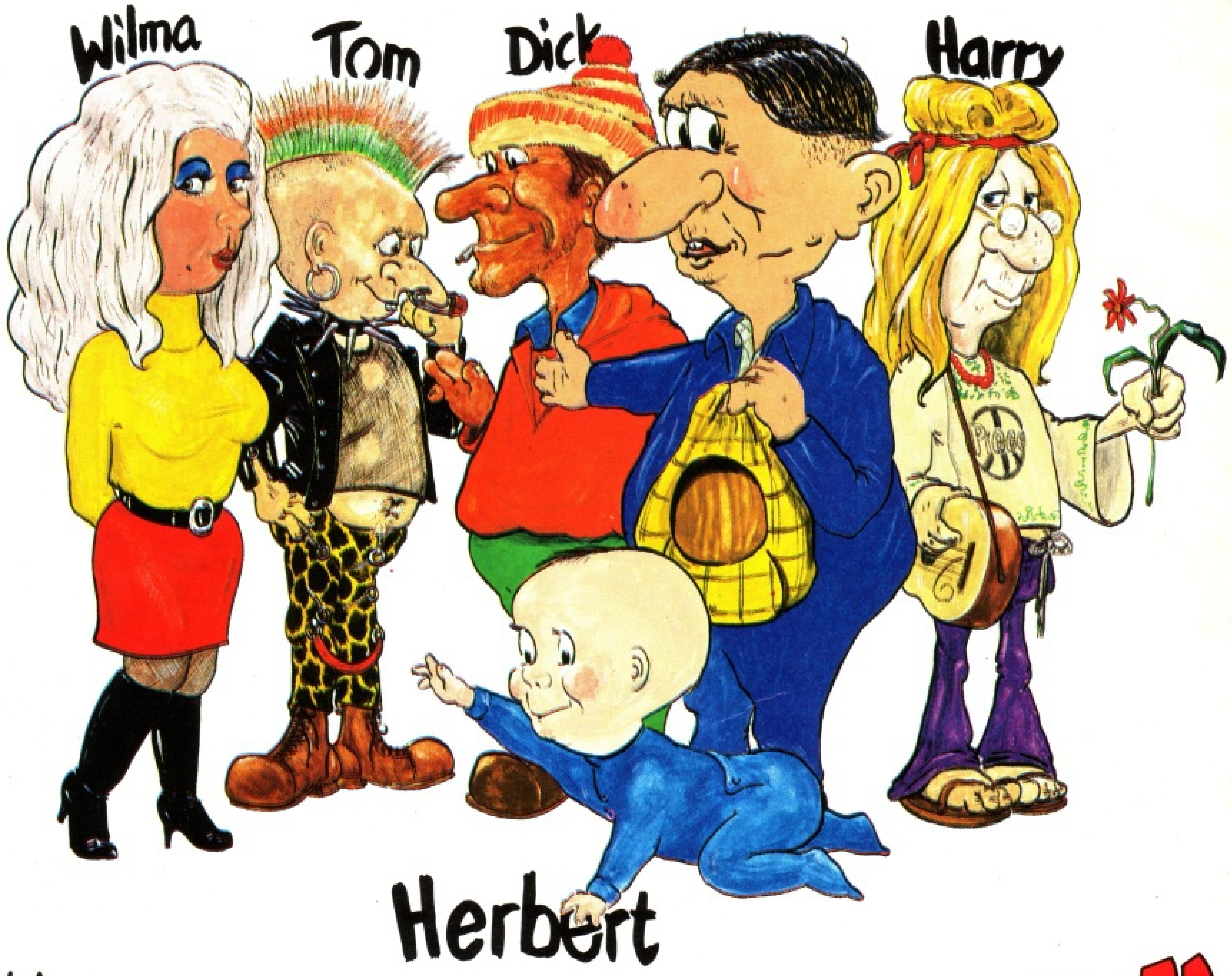
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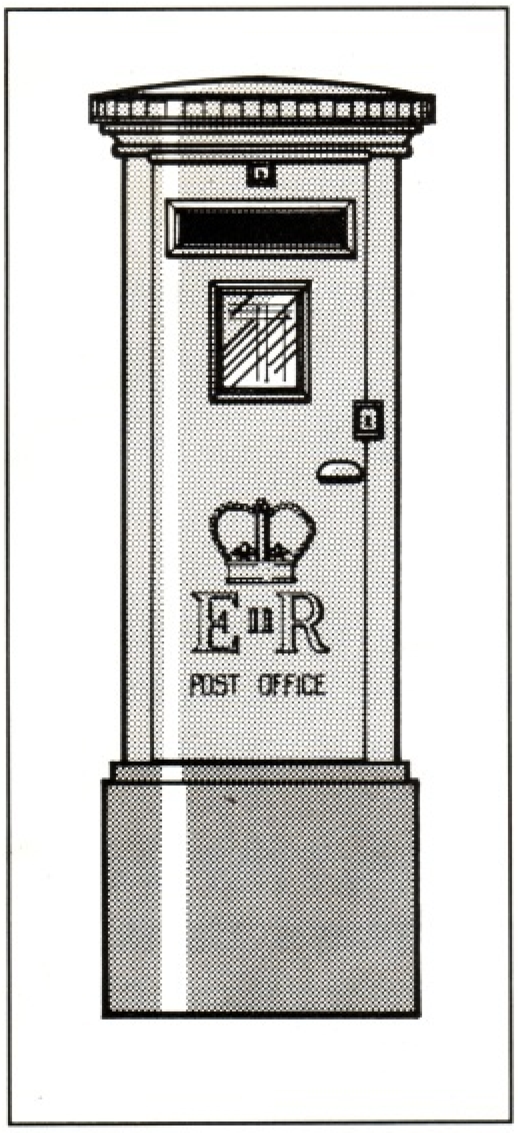
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MIKRO-GEN

44 The Broadway, Bracknell, Berks. 0344 427317

Please bear in mind that the views expressed herein are not necessarily those of Amstrad or Amsoft. Be assured that all your views are given thorough consideration. This letters section is the Amstrad Computer User's own forum.

Write to reply



Easy Reader

Ref. the QA problems, page 32 of July issue No 8. "Read Error A/Read error B". I think before sending the Arnold in for a service or replacement of the motor, the members who are experiencing this problem may like to use the simple remedy that I use and thereby in 95% of the cases, cures the problem.

First, fast wind the tape past the fault and then rewind. Second, using a hard flat surface, bang the cassette down firmly on this surface several times. This will cure 95% of computer faults and is also useful for audio cassettes when the "Play" "Fastwind" "Rewind" works eratically.

Note: the cassette should be banged down on its flat side. Of course the cassette should be cleaned and degaussed at regular intervals in the same way that a music cassette player is cleaned etc.

A.H. Meal
Leicester

Denmark Calling

We are 4 boys in Denmark who would like to get in contact with some CPC464 fans in England. We know how to make programs in machine code, some are better than others. We would like to get in contact with someone, for the purpose of exchanging programs, know-how, and news about the Amstrad. We are capable of fixing hardware problems you may have. We have found a very cheap solution to the problem about the Centronics latch; in fact all you have to do, is to install 35 cm. wire, and there is no problem. Right now we are working on some gear to code EPROMS (sorry, we don't know the English word), and in connection with that, we are developing modules to insert in the back of the CPC464. We are interested in any kind of programs, games and the more serious programs.

If you are interested in further contact, please write us a letter, with your name, full address, and your phone number. Everyone who write to us, will get an answer.

Send your letter to:

Carsten Madsen
Gl. Skolevej 13
Tulstrup
3400 Hillerod
Denmark.

Unfair Review?

May I take this opportunity to correct the highly misleading criticism of my book Adventure Games for the Amstrad CPC464 featured in the July issue of your magazine.

(1) I wonder what Mr. Green means when he says that there are "large chunks of BBC material" in the Amstrad Book? On checking the text I found just three sentences where I've accidentally used BBC jargon - PROCs are mentioned twice, LOCAL variables once and the reference to a question mark - once. Does Mr. Green seriously believe that this proves that the book "doesn't even know which machine it is describing".

(2) Mr. Green's statement that I "(keep) talking about storing numbers in 'resident integer variables'" is a total fabrication! Even the BBC book only mentions the idea of saving values in integer variables during a CHAIN operation twice - and neither reference is included in the Amstrad book. (There is a case of information being moved from one variable to another which would indicate this - Ed)

This appears to be a very careless misreading of a single sentence on page 55 where, as on page 139, I specifically state that ALL variables are lost during the CHAIN operation.

(3) It is true that I said that 'hex' values must be used in a SYMBOL statement, because the Amstrad User Manual always uses hex values in this context. My only mistake was the assumption that using hex values was an essential feature of the SYMBOL statement.

(4) Mr. Green's comment on the demo program on page 33 is, unfortunately, correct. This is not, however, because the programs were not tested on the Amstrad. It was due to a simple typing error - B=20 should have been B=10 in line 10 - during the process of preparing the listing on the computer I was using temporarily for word processing.

So where does this leave us? Are Collins really so evil as to issue a book that doesn't know what machine it was written for? Or is Mr. Green making such a fuss because he has some personal axe to grind?

In the first place Collins are publishers, not computer experts. If this book has faults then they are MY repsonsibility (which is why the book includes my personal promise to answer all queries as quickly as possible). I may say that I deeply resent Mr. Green's positively libellous attack upon the very helpful and conscientious group of people who prepared my manuscript for publication.

In the second place: What is so wrong about issuing several versions of a book for different machines? Does Mr. Green know of any important publisher who doesn't do the same thing?

The reasons behind this practise are very simple - whilst Mr. Green and his cronies were sniggering about 'search and replace' Collins were taking note of comments sent in by booksellers and readers. Comments like: people who buy computer books greatly prefer machine-specific guides, no matter what the subject.

Far from being contemptuous of their customers,ollins rejected the initial plan for a one all-machine book on adventuring and went to the added expense of producing four separate books. Even Electron and BBC users got their own books rather than being lumped together.

If Mr. Green knows anything about programming adventure games then he will realise that each game, as with any specialised program, is made up of more or less the same routines as any other adventure. The important differences are in

the skill of the programmer, the imagination of the writer and the particular dialect of Basic or Assembly Language used in the coding - which is exactly mirrored in my books.

To judge from the uniformly complimentary nature of my postbag, and the fact that the Amstrad book is already in its second printing, as well as having been sold to a German publisher, I would say that Mr. Green would be well advised to learn a little more about what the public wants instead of being in such a hurry to tell them what they ought to get!

A. Bradbury
Hove

ROM for Improvement

I am sure I speak for many other anxious CPC464 owners when I ask whether commercial cassette based software designed for the 664 run on the 464. It seems to me that once the 664 establishes itself, software houses will start writing programs (games etc) for this computer utilising the new ROM, and basic commands, which are absent from the 464.

M. Bannister
Hants

ACU: *With many thousands of CPC464's out there we doubt that many manufacturers will pass up the opportunity to produce a program which works on both machines.*

Monsterless

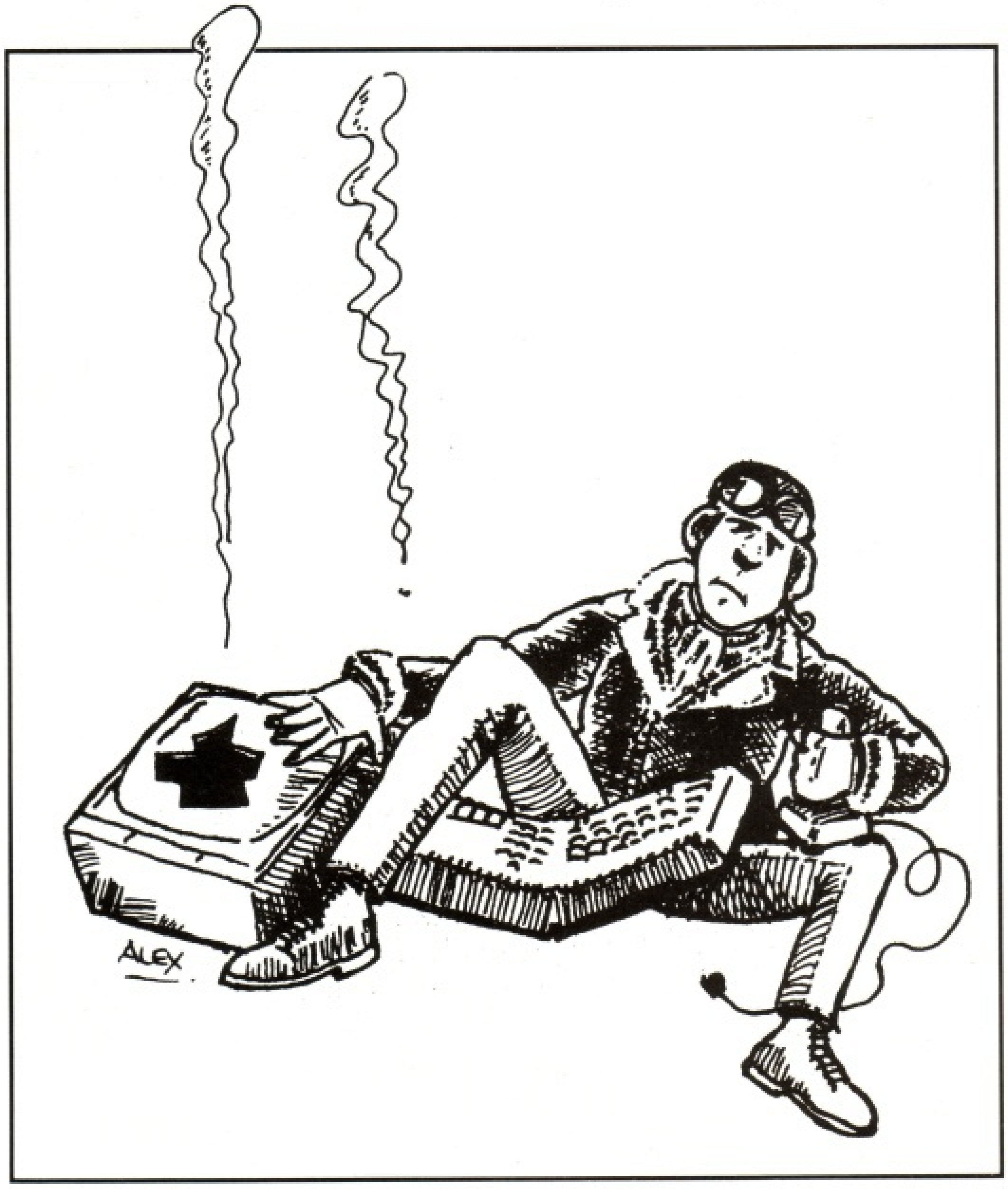
I seem to be having a bit of difficulty wth the 'Monster's Final Hour' program. I can't find the monster!

I have found a secret panel in the library but when I go west I fall over in the dark. If I light the candle so that I won't fall over, I die for some mysterious reason. I have found some gold electrodes to kill the monster, but not him!

I have found: a knot, a key, a lemon, a needle and thread, a bin, a box of matches a pen in a holder, a candle, a painting, a map, rubber gloves, a stale sandwich, a diary, a screwdriver, a crowbar, a spade and a large crucifix. I can't get the crucifix though, the computer (464) won't accept get or take etc. Please help me!

J. Nay
New Malden

ACU: *You were on the right tracks, but it sounds as if you have made a typing mistake, please check your listing.*



All Cut Up

As a new reader of your magazine. I have but one complaint.. That is having to cut up your magazine to send of Competition Entry forms etc.

When you cut them out. You are more than likely to cut out a page of a article or review you want to look back on (we do keep your magazines as reference books you know).

You can put 4 to 6 official Competition Entry Forms, on one page at the back of the magazine. With details etc of the Competition on pages within the mag.

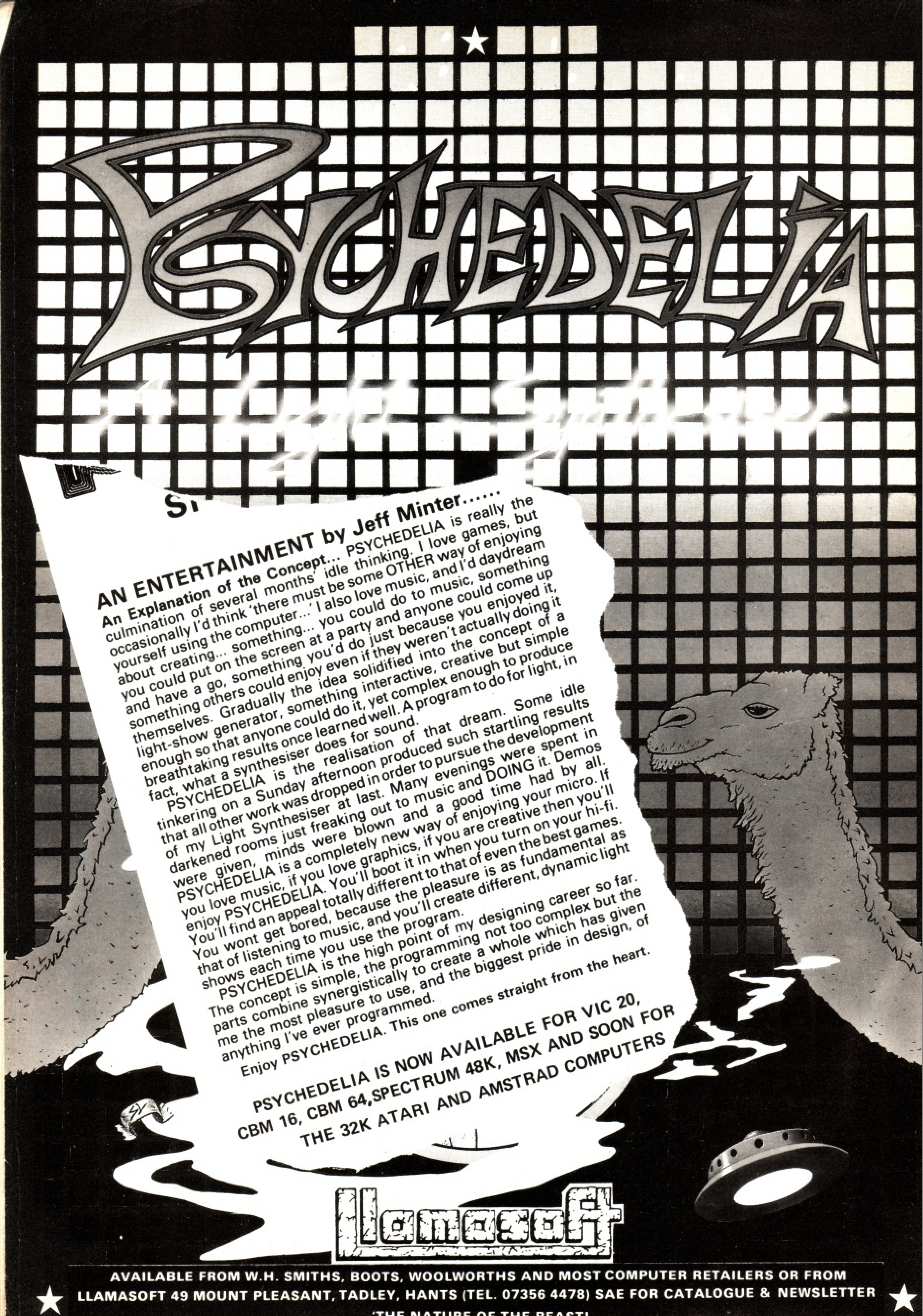
What do you think?

M.C. Ripon
N. Yorks

ACU: *Whenever possible we put entry forms on pages which back onto advertisments. This is not always possible but we do try. Some entry forms include crosswords or some other clues, these really need to be put next to the competition and this rules out our using one page for entry forms.*

A Lorry Driver Writes?

Well I've done it... I've bought me Arfur -sorry Arnold 464. I've joined the club (already this letter has undertones), I've got (very promptly) all the back issues mags. I've got the software for the little 'uns. I've got the serious stuff for meself - you know -databases, spreadsheets, adventures! Talking about adventures, I've got this one called Classic Adventure. I've read tomes about it. Oh and me microdrive is on the way - should speed things up. Oh yes, the Classic gets by 'im, at least not until I read he don't like birds? So for the upteenth time I loads it in and within a minute or so (oh I know my way around all right) he's rearing his ugly head and spitting at me. Right says I throwing the bird at 'im. Right says 'e, making mincemeat of it..! Back to square one and soon back to the snake with a bird in the hand. Why not fatten 'im (the bird) up I thinks - so's I feed it some food - it turns out not only not to be 'ungry but also I learn it survives on a diet of bird seed and is supposedly 'pining for the fjords', I mean what sort of banter is that for a machine to throw at me. Anyway finally I finds a way past the scaly nuisance by unloading all my hard won bits and pieces. Lo and behold something different on the screen (how is it I've still scored 00 out of a possible few hundred???) a beautifully written list of jewels, money, treasure chests and what have you. I sits back WELL AWAY FROM THE ARNOLD to digest all this information , make a few notes, and plan my strategy. The PROGRAM CRASHED. So did the copy of Classic Adventure. What happened, I'm still numb from the shock. No excuses from you or any of your minions


PSYCHEDELIA
AN ENTERTAINMENT by Jeff Minter......
An Explanation of the Concept... PSYCHEDELIA is really the culmination of several months' idle thinking. I love games, but occasionally I'd think 'there must be some OTHER way of enjoying yourself using the computer...' I also love music, and I'd daydream about creating... something... you could do to music, something you could put on the screen at a party and anyone could come up and have a go, something you'd do just because you enjoyed it, something others could enjoy even if they weren't actually doing it themselves. Gradually the idea solidified into the concept of a light-show generator, something interactive, creative but simple enough so that anyone could do it, yet complex enough to produce breathtaking results once learned well. A program to do for light, in fact, what a synthesiser does for sound.
PSYCHEDELIA is the realisation of that dream. Some idle tinkering on a Sunday afternoon produced such startling results that all other work was dropped in order to pursue the development of my Light Synthesiser at last. Many evenings were spent in darkened rooms just freaking out to music and DOING it. Demos were given, minds were blown and a good time had by all.
PSYCHEDELIA is a completely new way of enjoying your micro. If you love music, if you love graphics, if you are creative then you'll enjoy PSYCHEDELIA. You'll boot it in when you turn on your hi-fi. You'll find an appeal totally different to that of even the best games. You wont get bored, because the pleasure is as fundamental as that of listening to music, and you'll create different, dynamic light shows each time you use the program.
PSYCHEDELIA is the high point of my designing career so far. The concept is simple, the programming not too complex but the parts combine synergistically to create a whole which has given me the most pleasure to use, and the biggest pride in design, of anything I've ever programmed.
Enjoy PSYCHEDELIA. This one comes straight from the heart.
PSYCHEDELIA IS NOW AVAILABLE FOR VIC 20, CBM 16, CBM 64,SPECTRUM 48K, MSX AND SOON FOR THE 32K ATARI AND AMSTRAD COMPUTERS
llamasoft
AVAILABLE FROM W.H. SMITHS, BOOTS, WOOLWORTHS AND MOST COMPUTER RETAILERS OR FROM
LLAMASOFT 49 MOUNT PLEASANT, TADLEY, HANTS (TEL. 07356 4478) SAE FOR CATALOGUE & NEWSLETTER
'THE NATURE OF THE BEAST'

mind, I want a straight answer. I really didn't tough it - I'm not that stupid, I'm experienced you know, I've owned a computer before, that Naval one, you know, the Admiral 64 or something... Not a patch on this machine mind. To show you how experienced I am I've actually managed to make MOST of your listings work. EXCEPT whenever I get programs with more than one listing I cannot for the life of me get the darned things to work! I've got a job to go to, I can't keep staying up until 3 in the morning beating my fingers and my head against the keyboard trying to figure out why the likes of ROCK HOPPER won't run. I know what you're going to say, buy a copy of the firmware manual or whatever it is, I would but I've run out of the green things -that partly caused by being late for work every day! If you'd like to send me one for nothing I'll send you the money sometime, I'm expecting this giro you see? Can't really find any use for the file the User Club sent me, nothing fits in it, stupid piddley little thing, who designed that then? Mind you it's just the right size for holding electricity, gas and telephone accounts, can't pay 'em, I've got all this computer equipment you see!

Seriously... hope you can help with a few of the above points, it's a marvellous machine so from User Club member No 5224008510125745, that's never a membership number is it?, all the best, hope to hear form you and keep up the marvellous work on the magazine.

J W Baldwin
Bath

Onto Disc

We have recieved many letters about Level 9 Adventures on the new Amstrad CPC64. They are not yet available on disc, but we have discovered that the cassette versions work on the CPC664 if you type the underlined commands below (to get "|", press SHIFT and "@").

For Colossal, Quest, Dungeon, Snowball and Lords of Time adventures, type |TAPE : MEMORY &2FFF and LOAD "ADVENTURE", &3000 Start the tape and press any key. When the tape has loaded, type CALL &3000.

For Eden, Emerald Isle and Red Moon adventures, type |TAPE and RUN"" Start the tape and press any key whenever the computer asks you to.

Disc versions should be available alter this year, and owners of cassette games will be able to upgrade to disc versions fairly cheaply. In the meantime, I hope this letter will be of interest to readers.

P. Austin
Level 9 Computing

Gemini

SERIOUS SOFTWARE FOR THE AMSTRAD 464/664

The Cash Book Accounting programs described below are designed for the small to medium sized business, whether a sole trader, partnership or limited company. All need an Amstrad 464 or 664, an 80 or 132 column printer and cassette or disk storage.

Each program has been specially written to use the computer's huge memory and is a 'stand alone' program. However, the Cash Book and Final Accounts programs also interface to produce a superb combination pack for really serious business users, as well as practising accountants.

Each program is supported by a comprehensive, easily followed manual, and 'user friendly' screen prompts with error trapping routines, which make a specialised knowledge of accountancy unnecessary for the average user. The software is, however, capable of advanced accounting use, and in order to fully appreciate and interpret the Balance Sheet a discussion with your professional adviser or Bank Manager may be advisable.

We confidently recommend these programs to serious commercial owners of the Amstrad, and hope they will enable you to operate your business on a more effective, efficient and profitable basis.

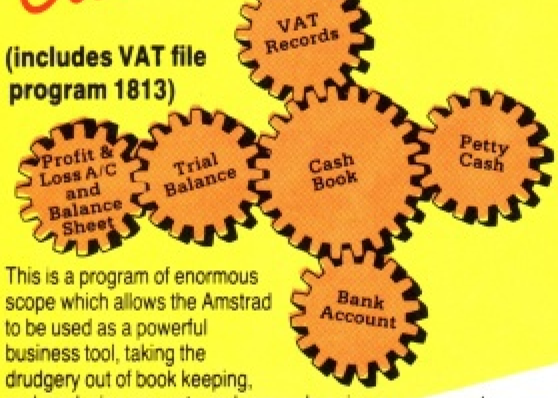
Dale J. Hubbard, Managing Director

Peter S. Meherne MIAP **Software Director**

THE **COMPLETE** CASH BOOK ACCOUNTING SYSTEM

Cash Book

(includes VAT file program 1813)



This is a program of enormous scope which allows the Amstrad to be used as a powerful business tool, taking the drudgery out of book keeping, and producing accurate and comprehensive management information.

In its simplest form the program will replace your Cash and Petty Cash books BUT Gemini's program, in effect, does much more. In addition to recording cash and bank transactions, the program will allow you to enter credit sales and purchases, and for all of these entries it will automatically complete the double entry routines, to ensure that your records are always in balance.

Sales and Purchase ledger control accounts are included, which makes the program ideal for integration with an existing manual sales or purchase ledger system.

The program also includes the following features:

1. Balance at Bank for up to 5 separate Bank Accounts.
2. Petty Cash in hand for up to 3 separate Cash Accounts.
3. A listing of all nominal account titles (maximum 199), most of which are user definable).
4. Monthly transaction summaries and departmental analyses of sales and purchases.
5. VAT memo account balances (sales/net purchases), and VAT accounts.
6. Batch printouts of all transactions entered in current program run.
7. Total debtors and creditors, sales, overheads and Trial Balance.

The program is therefore a complete 'stand alone' accounting software package, ideal for both business users, and practising Chartered Accountants, since an infinite number of different Cash Books may be kept on a single Amstrad.

A full audit trail of all data entered in the program is produced and a journal entry routine is incorporated to facilitate adjustments to individual nominal accounts, prior to producing a final Trial Balance. The latter interfaces automatically with Final Accounts program C.1806, so that a Profit and Loss Account and Balance Sheet can be prepared from data held in the Cash Book program.

Cassette C.1805 £59.95
Disk D.1805 £64.95

VAT File

Whilst this program will benefit most VAT registered businesses, it is also designed for those users who are on one of the special retailers schemes for VAT, which requires them to analyse their expenditure invoices over the various rates of VAT, in order to calculate their VAT output tax. The program will provide the following:

1. A means of recording invoices.
2. A printed copy of all invoice details.
3. Accumulated totals of different types of transactions.
4. The facility for coping with a multi-rated VAT system.
5. Information needed for the preparation of VAT returns.
6. The facility to sort and print transactions by date, invoice reference or customer/supplier name.

The package is capable of dealing with up to 140 transactions in a single batch and the different transaction types are processed in separate batches, which are then printed out as a permanent record. Cumulative totals for gross takings, VAT at standard rate etc. are stored in a data file on disk or tape which can be loaded at the start of every session to provide 'brought forward' totals for the program.

Cassette C.1813 £19.95
Disk D.1813 £25.95

Final Accounts

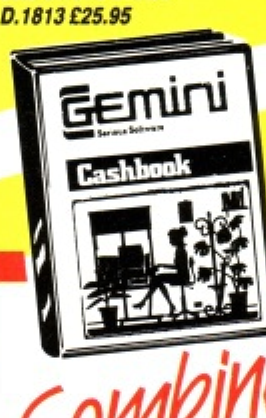
This program is designed to produce a Trading and Profit & Loss Account and Balance Sheet, either from the final Trial Balance produced by Cash Book program 1805 or from any other Trial Balance making it a truly stand alone 'Final Accounts' program.

The facility to produce these documents quickly, accurately, and regularly is of enormous help in running any business, large or small, since one shows the true profitability achieved, and the other the exact strength of the business in terms of assets and liabilities.

The program also allows insertion of budget or comparative figures which can be shown alongside the actual figures, together with notes to the accounts, and the opening Trial Balance for the following period.

Whether used by businessmen or practising Accountants, this program allows the Amstrad to be used as a real business computer producing vital information for decision makers with enormous ease and accuracy.

Cassette C.1806 £59.95
Disk D.1806 £64.95



Bona fide dealers, distributors and overseas licensees for Gemini software always required. Educational establishments contact us for details of our fuss-free licensing agreements.

Combination Packs

Designed to offer maximum value and convenience to serious business users, by combining several programs in one handy pack, together with their appropriate manuals.

Contains: Cash Book (including VAT file) and Final Accounts.

	Normal List Price of Programs in Pack	Combination Pack Price	Saving
C.1818 Cassette	£119.90	£89.95	£29.95
D.1818 Disk	£129.90	£99.95	£29.95

BEAUTIFULLY PACKAGED AND DOCUMENTED, THESE EXCEPTIONAL PROGRAMS PROMISE TO BECOME 'BEST SELLERS' FOR ALL AMSTRAD STOCKISTS, AND ARE CONFIDENTLY RECOMMENDED AS 'STATE OF THE ART' SOFTWARE FOR THIS POPULAR, COMPETITIVE HOME MICRO.

Database Management System

Unleash the data storage capabilities of your Amstrad with this powerful database program from Gemini, the market leaders in home computer software!

Your Gemini Database will allow you to store, retrieve and manipulate data in a variety of useful ways — just as you would with a manual card index system, but with extra capabilities, such as:

- Set up your own user-definable card layout in 40 or 80 column mode.
- Up to 20 fields allowed, each with 160 characters — to a maximum of 1000 characters per card. Up to 999 records available, making full use of the 464/664's memory capacity.
- Extensive mathematical and field relational expressions may be used, including totals and averages.
- Quickly sorts alphabetically or numerically, even names by surname if required, with or without case discrimination. Sorts may be performed on subsets of records on ANY field.
- Integrates with Report Generator (available separately) to produce standard mail-merged form letters, mailing labels up to 3 across page etc.
- Change record format at any time, add or delete fields after set-up.
- Completely user-definable field summaries available to both screen and printer — 40 or 80 column display mode.
- Delete records.
- Browse with instant edit/print/delete options.
- Simple menu-driven operation.
- Utilises machine code routines — no long 'garbage collection'.
- Files may be merged enabling the appending of files without tedious re-typing.
- Superbly documented in an easy to understand style — just as you would expect from Gemini!
- Comes with two documented demonstration files to show the extensive capabilities of the software.

Cassette C.1801 £19.95
Disk D.1801 £25.95

Report Generator

Requires Gemini Database Program No. C.1801 and Printer

This program will allow you to present and print your Gemini Database data in formats that you design yourself on-screen.

Look at some of the ways in which you can use it:

- Re-arrange your record layout to meet specific printed requirements.
- Create sets of mailing list labels from database records, up to three across your printer.
- Create documents inserting merged fields into text, just like the expensive word-processors!
- Design field summaries for columnar presentation of data, and total any given column.
- Ideal for mail-merged standard letters.
- Create any number of standard documents from one database file.
- Will even right-justify documents, automatically adjusting for variable length merged data.

Technical Details

RECORD MODE: 1600 characters of text available, including field data. Headers and Footers may be entered when using printer paging options.

MAILING LABEL MODE: 1-3 labels across page, with automatic compacting of lines to sequence the printer.

DOCUMENT GENERATOR MODE: 3200 characters available per document, with merging of up to 20 fields in any position on document. Any field may be used more than once. Automatic justification.

FIELD SUMMARY MODE: Up to 20 fields may be specified, maximum of 160 characters each.

Cassette C.1820 £19.95
Disk D.1820 £25.95

Home Accounts

The Gemini Amstrad Home Accounts is a suite of two programs offering comprehensive management of home finances. It is quick and easy to use and includes the following main features:

- Computer aided budget design.
- Up to 30 expenditure allocations.
- Financial year may start with any month.
- Amendments to budget at any time.
- Up to 24 characters per transaction.
- Automatic warning if bank charges likely.
- Forecasting of balances and expenses.
- Bar charts of budget/actual income/expenditure.
- Various printer routines.
- Powerful search routines including:
  Date, or range of dates
  Allocations
  Transaction details (specific name)
  Credits
  Combinations
- Simple to check account totals and running totals against budget at any time.
- All account entries sorted into date order if required.
- Simple amendment or deletion of entries.
- Date entry validation.
- Full summary by allocation.
- Four types of monthly summary.
- Automatic entry of standing orders.
- Plus more...!

Cassette C.1807 £19.95
Disk D.1807 £25.95

Gemini

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Industrial Estate, Exmouth, Devon EX8 4RS
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Ref.	Item	Cass/Disk	£ each	Total
1805	Cash Book			
1813	VAT File			
1806	Final Accounts			
1818	Combination Pack			
1801	Database			
1820	Report Generator			
1807	Home Accounts			
			Total	

Cheque/P.O. enclosed £ ....
Or charge my Amex/Access No. .... Signature ....
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Prices include VAT and post and packing

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- Unbelievable Sound Effects
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- Multiple Screens
- High Resolution Scenario
- 100% Machine Language

Voted by U.S. Billboard magazine as the best game for sound and graphics on the Commodore 64

It's a unique arcade experience in sound and vision and a stunning display of Amstrad capabilities.

Another quality product from ***ACCESS*** Software.



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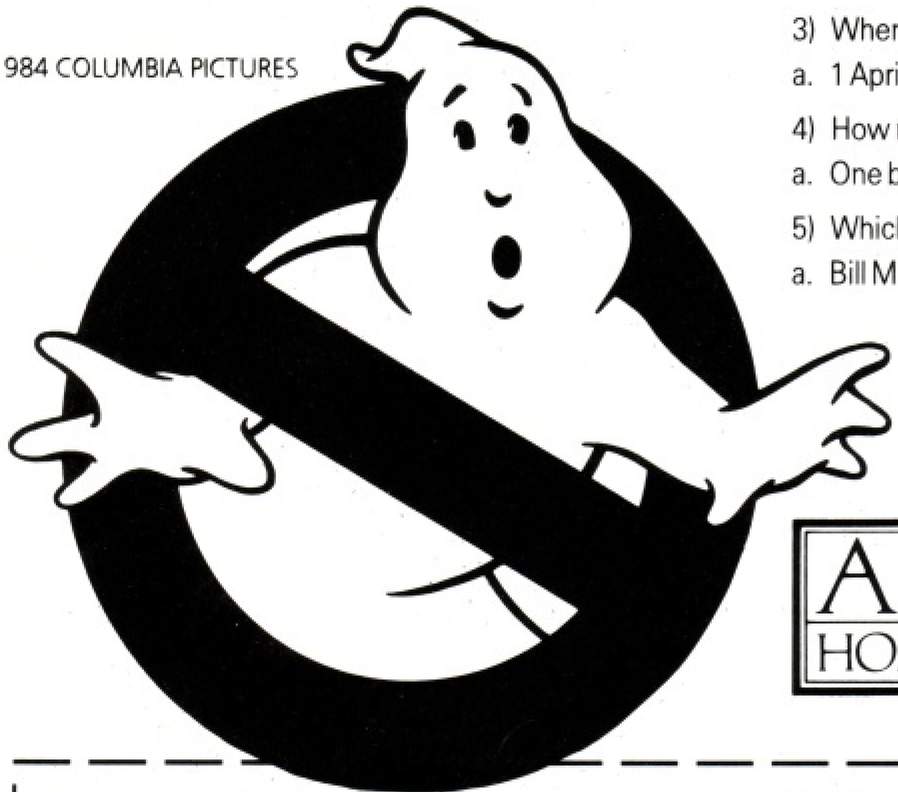
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What You Gonna Win?..

GHOSTBUSTERS

Have you ever wanted to set up your own business? Now is your chance, with each copy of Ghostbusters you win a business of your very own. You become a parapsychologist, your job is to capture and contain all those nasty little ghosts. The bank agrees to a loan and if you can make enough money before the bank changes its mind you can make a mint. Running any business is difficult, you will need to judge carefully how to spend your money and then be skillful in your work. The game follows the film quite closely, so if you were a fan of the film and you don't yet have the program you are missing out. Activision, who wrote the program, have let us have 100 copies of the program to give away, don't delay, pick up a pen and enter now.



What you gonna win

Below there are five questions on ghosts, computers and the film "Ghostbusters". Each question has four possible answers, all you have to do is pick the right answer for each question and put it in the appropriate box on the entry form.

1) Who sang the theme tune to the film

a. Alan Parker b. Duran Duran c. Ray Parker Jnr. d. The Police

2) Which one of these Shakespeare plays does not feature a ghost

a. The Merchant of Venice b.Macbeth c.Julius Caesar d.Hamlet

3) When would you be most likely to see a ghost

a. 1 April b. Oct 31 c.Nov 5 d.Feb 13

4) How many Ghosts where there in "A Christmas Carol"

a. One b.Two c.Three d.Four

5) Which of these actors was not a Ghostbuster

a. Bill Murray b.Dan Aykroyd c.Harold Ramis d.Ivan Reitman

ACTIVISION
HOME COMPUTER SOFTWARE

Rules

The winner will be the first 100 correct entries drawn on September 27th 1985.

Thereis no limit to the number of entries any individual can make, however all entries must be on an official entry form; photocopies are not acceptable

3 Entries should be sent to:
Activision Competition,
Amstrad User Magazine,
169 Kings Road, Brentwood,
Essex.
CM144EF

4 No correspondence can be entered into regarding the competition. Entries cannot be returned.

5 Your answer must be written on the back of the envelope.

6 The judges decision is final.No employees of Amstrad,Amsoft,or Amstrad User, nor their relatives may enter.

Entry Form

Name ....

Address ....

....

....

Answers 1 .... 2 ....

3 .... 4 .... 5 ....

SUPERCHARGE

SUPERPOWER SIDEWAYS ROM CARD (Ref A101)

This unit opens up a whole new field of personal computing, previously only available to owners of the BBC Micro and other top of the range computers.

The SUPERPOWER Sideways Rom Card has the following features:-

- Matching case, with easily detachable cover.
- Fits snugly to rear of computer.
- Bus extension for fitting of Disk Interface etc.
- Houses up to 7 Roms. (Foreground, Background & Extension).
- Any mix of 8K or 16K Eproms.
- No additional power supply necessary.

SUPERPOWER ROM BASED SOFTWARE

CURRENTLY AVAILABLE:

Programmer's Toolbox; Disk User's Utilities; Mailing List & Club Membership; Assembler, Disassembler & Machine-code Monitor.

COMING SOON:

Word Processor; Database ... END of AUGUST.

Spreadsheet; Graphics/Statistics ... END of SEPTEMBER.

Rom-based Software has the following important advantages:-

1. Written in machine-code, it is very fast in operation.
2. Programs are instantly available from the keyboard.
3. The program code does not use RAM, thus permitting much larger files to reside in memory, reducing the number of disk accesses and saving time when manipulating files.
4. The program itself cannot become corrupted.

SUPERPOWER PROGRAMMER'S TOOLBOX for the CPC 464 (Ref A104)

ADDITIONAL BASIC

TURTLE: Logo-like turtle graphics. TUNE: Output music string. CIRCLE: Draw a circle. FILL: Fill an area surrounded by foreground colour. GRAPHICS PEN/GRAPHICS PAPER: Set graphics and background colours. COPYCHR: Read a screen character. ECHO ON/ECHO OFF: Printer output on and off. PAGE ON/PAGE OFF: Paged screen output on and off. CLEAR INPUT: – clear input buffer. (+ extra graphics commands.)

PROGRAMMER'S AIDS

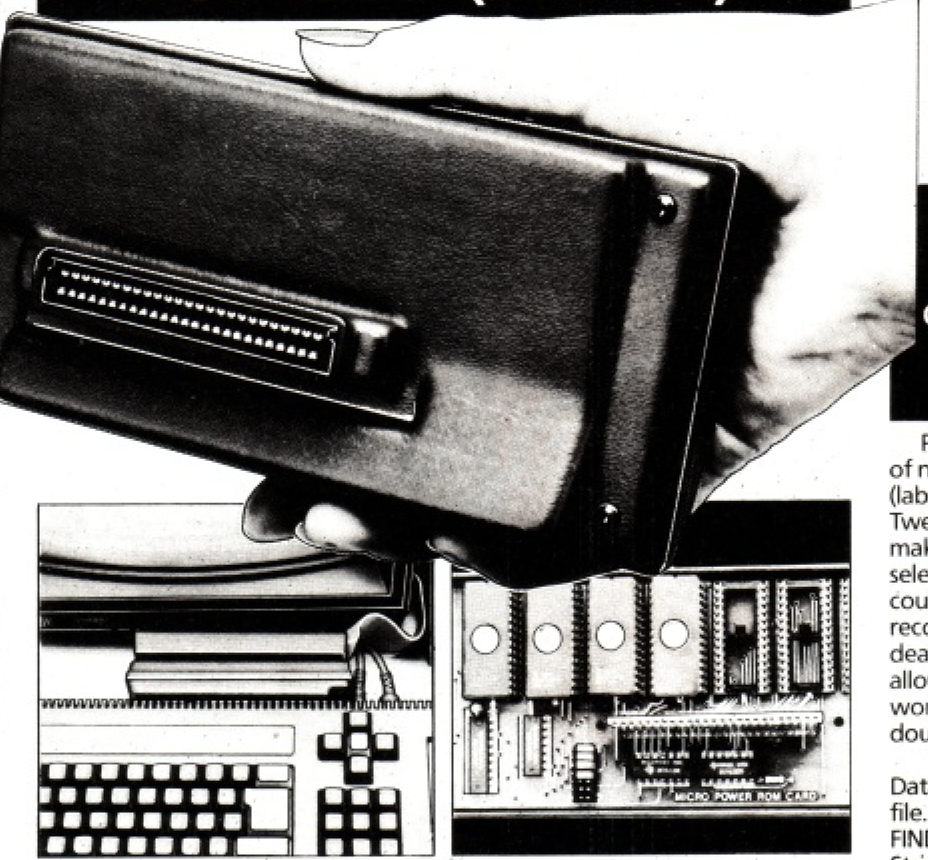
EDITOR: Gives 2 additional windows for program editing. FIND (& REPLACE): Find a string and optionally replace. XREF: List references to particular line numbers (GOTO's, GOSUB's etc). COMPACT: Remove REM statements. FRAME: Synchronise screen update with frame fly-back. PRINTER: Epson-compatible or Amstrad printer for dump routines. FDUMP: Fast two-tone screen dump, with user-definition of 'pen' and 'paper'. CDUMP: Shaded screen dump depicting up to 9 colours. PLOAD: Load program saved under 'P' option. INFO: Give details on specified disk file. MEDIT: Comprehensive HEX and ASCII memory editor. LTRON (LTROFF): Send TRACE output to printer. HELP: List commands, functions and their parameters.

SUPERPOWER DISK USER'S UTILITIES (Ref A103)

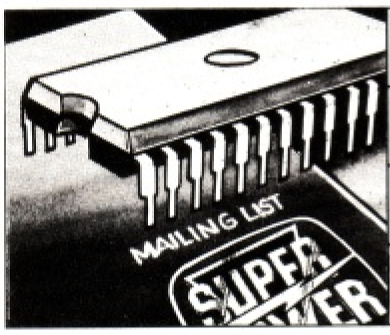
Program allows detailed inspection and modification of information held on disk and is of particular use for recovering data from corrupted disks. Individual sectors can be read from and written to. All data can be output to the screen and/or printer. Program also contains a number of functions of use to assembly language programmers.

TABULATE DIRECTORY: Displays directory and enters EDIT mode. READ DISK SECTOR: Read sector and enter EDIT mode. LOAD DISK FILE: Load first sector into buffer and remainder to memory for fast access. Enter EDIT mode. LOAD UPPER ROM: Catalogues resident roms, prompts for rom selection and enters EDIT mode. EDIT MEMORY: Displays current buffer. Data displayed is Buffer Address, Hex and ASCII. Comprehensive editing facilities. 'COPY' key gives Intelligent Data Copy. 'TAB' key gives printer output. WRITE: Write sector to disk. DISASSEMBLE: Disassembles code from specified address, giving address, object code, mnemonics and ASCII. Screen and/or Printer output. SEARCH MEMORY: Search sector or a complete file for ASCII string or series of Hex codes. UTILITIES: Includes Format, Hex/Decimal conversions, jump calculations etc. SCREEN UTILITIES: Select from four display modes; choose background and foreground colours.

SUPERPOWER SIDEWAYS ROM CARD (Ref A101)



FOR ONLY £39.95



SUPERPOWER PROGRAMMER'S TOOLBOX (Ref A104)	£39.95
SUPERPOWER DISK USER'S UTILITIES (Ref A103)	£39.95
SUPERPOWER MAILING LIST AND CLUB MEMBER-SHIP PROGRAM (Ref A102)	£39.95
SUPERPOWER ASSEMBLER, DISASSEMBLER & MACHINE CODE MONITOR (Ref A105)	£39.95

SUPERPOWER MAILING LIST AND CLUB MEMBERSHIP PROGRAM (Ref A102)

Program handles thousands of name and address records (label and non-label fields). Twenty classification indicators make possible sophisticated selective examination, counting and printing of records. Alphabetical order is dealt with on data entry, allowing user to select 'key' word. Works with single and double disks as well as cassette.

Main Commands ... ENTER: Data entry(*) GET: Load new file. COUNT: Selective Count. FIND: Find 'Name' or any String(*). LIST: List current file on screen (*). PRINT: Print label data or whole records selectively. MERGE: Merge and Sort files. SAVE: Write a file to disk or cassette. RESET: Reset colours, label sizes, class definitions, string constants etc. (*Editing facilities available.)

SUPERPOWER ASSEMBLER, DISASSEMBLER & MACHINE-CODE MONITOR (Ref A105)

This suite of routines represents the complete Development Package for the Amstrad Z80 programmer. The assembler has a sophisticated text editor, a comprehensive set of options, is very fast and incorporates special techniques enabling large source files to be handled in memory. The full-feature disassembler produces files which can be edited and then re-assembled.

The Machine-code Monitor routines are extremely powerful, including the setting of conditional breakpoints (including loop counter option), single-step execution, alternative five column binary and mnemonic formats. Both sets of Z80 registers can be displayed. Other options include Intelligent Move, Modification of code to run at a new address and colour selection of border, paper and pen.

ROM-BASED SOFTWARE FULFILS THE PRO

YOUR AMSTRAD.

SUPERPOWER ADVICE CENTRES

The following computer specialists stock the SuperPower Rom-card and Rom-based software for the Amstrad and are able to offer you advice and information on current products and the ever-expanding range:-

AVON
K & K Computers, 32 Alfred Street, Weston Super Mare. 0934 419324.

BEDFORDSHIRE
Chilton Computers, 76b Dallow Road, Luton. 0582 455684.
Hobbyte Limited, Unit 1G, Arndale Centre, Luton. 0582 457195.
Zedem Computers, 2 Kimbolton Road, Bedford. 0234 213645.

BERKSHIRE
Gadgets, 30 Peascod Street, Windsor. 07535 67211.

CHESHIRE
Northern Computers, Churchfield Road, Frodsham. 0928 35110.
Pyramid Micros, 25 Cairo Street, Warrington. 0925 35713

CLEVELAND
Multicoloured Micro Shop, 8 Dundas Street, Redcar. 0642 486643.

DEVON
Computerbase, 21 Market Avenue, City Centre, Plymouth. 0752 672128.
Computer Systems (Torbay), 35 Hyde Road, Paignton. 0803 524284.
Georges Booksellers, 147 Sidwell Street, Exeter. 0392 71072.
Open Channel, Central Station Buildings, Queen Street, Exeter. 0392 218187.
Computerware, 10 Lower North Street, Exeter. 0392 210507.

EIRE
Bit by Bit, 6 Castle Street, Bray, Co. Wicklow. 001 868 541

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Clarke Coyston Computers, 332 London Road, Southend on Sea. 0702 337161.
Estuary Personal Computers, 318 Chartwell North, Southend on Sea. 0702 614131.
Computerama, 88-90 London Road, Southend on Sea. 0702 335443.
Colchester Computers, 3A Short Wyres Street, Colchester. 0206 47242.
Mirage Microcomputers, 24 Bank Street, Braintree. 0376 48321.

HAMPSHIRE
Electronequip, 36-38 West Street, Fareham. 0329 230671.
Alton Computers, 62 High Street, Alton. 0420 87998.
Timatic Systems, Fareham Market, Fareham. 0329 236727.

HUMBERSIDE
Computing World, 10 Swaby's Yard, Dyer Lane, Beverley. 0482 881831.
Ashby Computer Centre, 247 Ashby High Street, Scunthorpe. 0724 871756.

ISLE OF WIGHT
V M S Computer Centre, Bus Station Complex, Newport. 0983 525450.

KENT
The Village House of Computers, 87 Beckenham Lane, Bromley. 01 460 7122.
Microway Computers, 39 High Street, Medway Towns, Rainham. 0634 376702.
Marlowe Micros, 9 The Friars, Canterbury. 0227 453531.
Adventurer's Guild, 26 Harmer Street, Gravesend. 0474 334008.
Numbus Computing, 6 Station Road, West Wickham. 01 777 3160.
MD Micros, 4a Crayford Way, Crayford. 0322 524123.

LANCASHIRE
Computer World, 208 Chorley Old Road, Bolton. 0204 494304.
I M O Computers, 39-43 Standish Street, Burnley. 0282 54299.

LONDON
Adams World of Software, 779 High Road, North Finchley, London N12. 01 446 7170.
Colmore & Microtanic, 102 Lordship Lane, Dulwich, London SE22. 01 299 1419.
Vic Oddens, 6 London Bridge Walk, London SE1. 01 403 1988.
Computers Inc., 86 Golders Green Road, London NW11. 01 209 0401.
G & B Computers, 230 Tottenham Court Road, London W1. 01 580 3702.

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RS232C Computers of the world unite

Lots of companies are now offering RS232C interfaces for Amstrad computers, Simon Rockman and Alex Martin look at the official offering and explore some of the avenues it opens up.

On the back of your Amstrad computer you have two edge connectors which allow you to communicate with the outside world (the 664 has an extra one for a second disc drive). Everyone with a printer will be familiar with the Centronics Printer port, this sends the signals to the printer seven bits at a time, and is known as a parallel port. An RS232C port is SERIAL, this means that the data is sent to and from the computer a bit at a time. In many ways this is not as useful as a parallel port, it is certainly slower. However the RS232C serial interface conforms to a worldwide standard and it is this which makes it so useful. Most computers either have an RS232C port or else someone makes a suitable interface, most manufacturers of computer peripherals offer an RS232C option and so even if you want to connect your computer to a device built before the CPC464 was even thought of there is a good chance that this interface will get you talking.

Physical Appearance

The Amstrad RS232C Serial Interface is housed in an Amstrad black case to match the computer. A short length of ribbon cable connects the interface to the back of the computer and allows the unit to stand on a desk rather than hang off the back of the computer. This overcomes the problems encountered in designing a box which snugly fits the back of a CPC464 without lifting the back of a '664. Each of the sides of the box has a connector of some sort. The front has the ribbon cable, the back an edge connector so that other peripherals can be plugged in. On one side is an industry standard 'D-connector' and to the left is a power socket.

The interface comes with a power supply built into the plug. The CPC464 may have been conceived as a one plug system but with the computer, disc drive, printer, serial interface and a modem all set up together it soon starts to grow. The power supply is needed to ensure that the full specification of an RS232C interface is met, some peripherals may need to draw more power than would be available if the device was powered from the computer's supply.

Documentation

In many ways it is the manual which really makes this package special. The first part of the 'RS232C Serial Interface User Instruction Book' is known as the "Book of Spells". This simplifies using the interface. Because the RS232C standard is basically just two wires in each direction (input and output) the devices at each end need to know exactly what is going on. Setting them up is often a matter of trial and error for the experienced user, for the novice it can be a nightmare. The book of spells helps to ease these problems.

Many of the popular applications for the interface are looked at in detail, all you need to do is leaf through the manual until you see the appropriate picture for what you want to do and follow the accompanying instructions. Could this be the first icon-driven manual? So if you want to transfer a file from a Sinclair ZX Spectrum to your CPC464 you leaf through until you find spell 17. This gives the correct wiring for the plug on the back of a Sinclair Interface 1 and even a short terminal program in ZX Basic.

The style of the manual is quite chatty, it explains why you need to do certain things as well as how to do them. It also suggests the best way to set things up, since the system powers on with a default speed of 9600 baud it recommends that you set your printer up to accept that instead of having to manually re-set the baud rate at the start of each session. The computer buff will appreciate the detailed appendices but I found the switch from the nice friendly 'Book of Spells' to a serious description of what each wire did to be a bit sudden. I would have liked to have seen an index and perhaps a summary of the commands available, however having seen the documentation for the RS232C interfaces on a number of computers the Amstrad manual was much better than I expected.

Firmware

As with many peripherals an RS232C interface is only as good as the supporting software. The Amstrad device is fully compatible with CP/M so either a commercially available program or one of the packages from the CP/M users group should fit the bill. There is, however, a nicer alternative. The RS232C interface comes complete with its own ROM. This first shows itself when you attach the unit and switch on the computer. Below the usual copyright message is the legend "Amstrad RS232C Serial Interface © 1985 Amstrad Consumer Electronics plc". The ROM contains a whole bunch of goodies to make communication with the outside world easier. Table 1 outlines these commands. Perhaps the most interesting of these is | PRESTEL.

About Prestel

Prestel is a service run by British Telecom. It consists of several mainframe computers connected to the telephone system which can be dialled up and then, using a micro computer with prestel software and modem, or a dedicated Prestel terminal, 'pages' of text can be downloaded and read from the screen. The pages can contain any information, travel, news, sport etc. They are normally enhanced by colour graphics. If you have the right equipment, ie. an Amstrad computer, RS232C Serial Interface, and modem, it is possible for you to dial up and see Prestel for yourself, using the Prestel firmware in the Serial Interface ROM. Lets

Making Connections



Table 1

Setsio	Change the baud rates & other parameters
Settimeout	Change delay before finishing
Setblockend	Defines the end of block marker
Outchar	Sends a specified character
Outblock	Sends a specified string
Breaksend	Sends a 'Break' signal
Inchar	Reads a character from the RS232C
Inblock	Read a string from the RS232C
Sio	Returns the status of the serial interface
Closesio	Closes the serial interface channel
Serial	Sends all stream ·8 data to the RS232C
Parallel	Sends all stream ·8 data to the centronics
Xon	Initiates XON/XOFF handshaking
Noxon	Cancels XON/XOFF handshaking
Terminal	Enters the terminal mode
Halfduplex	Sends data from keyboard only to RS232
Fullduplex	Sends data to both RS232 and screen
Ctrlaction	Causes a control character to be acted upon
Ctrldisplay	Causes a control character to be displayed
Setendfile	Changes character which specifies the end of a file
Blow	Send a file from disc or tape
Suck	Receive a file and save it to disc or tape
Romcat	List the ROMs
Romcat,n	List the available RSXes in ROM n
Ringwait	Waits for a set time (for use with a modem)
Romoff	Switches off all ROMs except BASIC
Refresh	Displays a Prestel screen held in memory
Prestel	Enters viewdata format terminal
Cursor	Moves viewdata cursor to a specified position
Saveprestel	Saves Viewdata screen from memory
Loadprestel	Load Viewdata screen into memory
Infile	Send a file from disc or tape
Outfile	Receive a file and save it to disc or tape

take a closer look at the facilites that Prestel offers and how it works.

Prestel has three basic character sets. The first is the alpha-numeric set which as you might expect produces numbers, uppercase and lowercase letters and various symbols. The second set is the graphics character set which produces block graphics. Each graphics character is divided into 2 by 3 sections (like large pixels) which can be set or unset. These characters are referred to as mosaics as they are small pieces intended to make up a larger picture. The third character set is the escape character set and this provides codes which turn on and off various Prestel features. Escape characters do not produce an image on the screen, they have a more subtle effect. You use escape characters to swap from one character set to another, turn on double height characters etc.

The main job of a Prestel terminal emulator, (the software that receives and displays Prestel information), is to interpret each code as it is received and turn it into its correct character, mosaic or escape code depending on the current state. Escape codes are used to set up the current state, by sending an escape character (ASCII 27) and then the character associated with the required command.

Prestel has a current display colour to be used next. Prestel does not support parameters following commands, so there are individual commands to set each colour. There are colour setting commands for both the alpha-numeric character set and the graphic set. For example, graphics red, alpha green. The seven colours that can be produced are red, green, yellow, blue, magenta, cyan and white. Black is used as the default background and cannot be used as a foreground colour. Text and graphics of different colours can be mixed freely in a single line.

Prestel uses the ASCII character set including control codes for moving the cursor, turning it on and off, clearing the screen etc. At the start of each new line all modes revert to their default. Single height, white on black alpha-numeric characters, displayed steady. Graphics default to contiguous, released graphics. It is possible to change the background colour by selecting the New background control code. The background colour will be changed to the current foreground colour and the remainder of the current line wil be displayed in that colour. A new colour command must follow to set the text to a visible colour. The reverse command which restores the black background is called black background. Each escape code takes up one character position on the screen and it is usually printed as a space. If hold graphics has been selected the last graphics character used on that line will be printed instead. This facility is reset at the start of a new line or when release graphics is issued. The double height command instructs Prestel to print the text on the current line double the height, with the extra part of the character, which can be alpha-numeric or graphic, obscuring the line below. The line obscured by double height characters will be ignored. Double height mode is turned off by normal height or reset at the start of a line. When this separated graphics mode is selected the pixels of each graphic character are seperated by a border of the current background colour. This is turned off by selecting the contiguous graphics mode or starting a new line. Flash mode causes the characters following the flash command to alternate between spaces and characters. This is turned off by selecting steady mode or starting a new line. While in graphics mode it is possible to print non graphic characters and these belong to the blast through character set.

The Prestel firmware redefines certain keys for convenience. The decimal point on the keypad has been defined as *. The enter key on the keypad produces an underline character. The cursor keys produce the correct control codes for cursor movement if the cursor is on. When leaving Prestel the previous key definitions are restored. The underline character is used by Prestel to mark the end of an input. Here the Veiwdata format breaks with the strict ASCII standard and uses a '#' character. Most viewdata software prints this as a '#', however this would be difficult to define with the character set used by the Amstrad Prestel character set and so it has been left as an underline.

Colours are set up by the Prestel firmware. The colours are set to those closest to the Prestel standard. The previous colours are not restored when leaving Prestel. The baud rates for transmitting and recieving data are not set by the Prestel firmware. This is so that bulletin boards that use the Prestel format but do not use the standard Prestel baud rates, can be accessed.

Good Prestel software is hard to write, particularly on a machine like the CPC. The Prestel standard dictates a 40 column eight colour display with some special features such as flashing characters. Some computers like the Oric and the BBC have a special screen mode to cater for this. Since codes

are sent to the sceen for a change of colour each screen need only be 1K in size and is ideally suited for a colour display designed for access over the telephone.

The Amstrad does not have a suitable screen mode so one has to be simulated using software. The 40 Column mode (mode 1) only has four colours. The mode with sufficient colours is only 20 columns wide (mode 0). Amsoft's solution to this problem is to use mode 0 and draw each letter four pixels wide. The result is not as pretty as using a proper 40 column mode but it is the most accurate.

All the CPC screen modes use 16K. This means that the 1K of information which is sent from Prestel has to be expanded and each of the characters drawn. This takes quite a while to do, even in machine code, so some characters could be missed as they are received. This problem was solved by having a 'buffer' in memory which stores all the information in the 1K compressed form. A second bit of the Prestel program reads this buffer and displays the information on the screen. One drawback of this system is that some of the more unusual 'dynamic' frames are not drawn in the correct order, although the end result is still accurate.

The main advantage of the buffer system for the user is that only the buffer needs to be saved, rather than the whole 16K screen. The buffer can be saved using the |saveprestel,@a$ command. On the 664 you can just type the filename rather than putting it into a string. A screen loaded using the |loadprestel command can be displayed on the screen by using the |refresh command.

Getting Connected

The number of devices which can be connected via an RS232C link is huge. The front cover shows just a few of the possibilities, let's look at some of them in more detail.

Microwriter

A microwriter is that little beige thing with the six brown buttons on it. Inside it's shell is a rechargeable battery, a processor and enough memory for about five close typed pages of text. It also has an RS232 port in it or it wouldn't be in this article.

It is a useful little device for typing in an article on the 8:15 from Liverpool Street on the way to work, or if your writing talents are stimulated by the great outdoors you can take it to the park or whatever.

Once you have typed in your words of wisdom it is a piece of cake to transfer it to an Arnold using the |INFILE command or PIP from CP/M and a simple lead. Shoving text the other way is just as easy.

Learning to use the unorthodox keyboard takes about $^3/_4$ hour. Not bad for a D.I.Y. touch-typing course. If more people would try the microwriter it would sell much better, it may yet prove to be the alternative to Qwerty the experts have been looking for.

Seiko RC-1000 Wrist Terminal

This is an electronic diary in a watch. The Seiko Wrist terminal can store long lists of information. The data is entered by using a computer with appropriate software and an RS232C interface. Once a file containing all the information you want to send has been built up the text can be sent over to the watch. Ideal for storing memos, 'phone numbers and other, short, snippets of information. This could be done equally well by a pen and note-pad. The low-tech method is probably superior since you don't need a computer to update a pad of paper. The RC-1000 really scores when it is used to store alarm calls. There are two types of alarm which can be set - Schedule and Weekly. A weekly alarm can be set, surprise, surprise, to go off every week. The schedule alarm can be set for any date within the next year. Up to eighty of these pre-set alarms can be set and whenever one is sounded the display shows a 24 character message. Ideal for reminding yourself to put the dustbins out or that tomorrow is a friend's birthday. The final main function is for storing world times. A map at the back of the RC-1000 manual shows that time is as much a political thing as a geographical one. When it is 12 Noon in London it is 6:30 pm on the Cocos Islands. This watch is just the thing for the jet-setting executive. For the rest of us I can't see the value in having 80 different towns and the time there ready for instant recall. As a watch the device is a bit ugly and there is not enough contrast on the twoline display for it to be read at an angle. As an RS232C peripheral the RC-1000 is a great example of what can be done, ideal for cheating in exams.

Psion Organiser.

The Organiser is a sort of halfway house between the Seiko watch and the Microwriter. A bit bigger than a calculator it is still small enough to fit into a jacket pocket and is ideal for storing the kind of information which needs to be slowly updated. Information is stored in cartridges. These can be written to and removed without destroying the data. Up to 32K of data can be stored at any one time using two 16K cartridges. There is a full alphanumeric keyboard laid out in alphabetical order. The keys are more like calculator buttons so entering the data can be a real bind. A simple solution to this is to store all the information you want in a remote database, such as Masterfile on an Amstrad and then use the Organiser link-up pack to transfer the data. Built into the Psion device is a search facility. This will allow the user to look for all the items containing a specific set of characters. So that more data can be crammed into the Organiser only upper case characters are allowed, any lower case characters sent over from the CPC are automatically converted. The Organiser link-up pack has similar commands to the Amstrad RS232C interface so file transfer is really very simple. There is a range of applications programs for the organiser, designed for specific users. These include medical, scientific and financial programs. There is a system for developing your own programs in Forth (although this needs an IBM PC and costs over £500) and there is a small programming language called POPL. Coming soon is a full terminal program, although how useful a 16 character display is for electronic mail remains to be seen. Marks & Spencer use Organisers for handling returned goods, when Psion launched the device they called it a software product with the hardware built to go around it as an aside.

Conclusion

There are many, many other applications for an RS232C interface, programmers can use it to move data from one machine to another, a serial interface can be used to control a variety of printers, plotters and robot arms. Before it arrived for review I thought that an RS232C interface was a really boring device but with the clear manual and ROM based software this full-spec interface may not be fascinating in itself however it opens up so many new areas of computing that it more than fully justifies its £49.95 price tag. ACU

Microscript

By Derek Wray

When I first bought my CPC464 back in October '84, it was with the idea of turning it into a word processor - one that would not break the bank. Before the disc drives arrived, I had to make do with Easi-Amsword, consoling myself with cups of tea while it loaded from a cassette. Now, with dual disc drives and Intelligence (Ireland) Ltd's Microscript, the machine has the feel, and most of the power of a professional word processor set-up. It is loaded and ready to go in 34 seconds. At the touch of a couple of keys, text can be centered, underlined, underscored, or changed from lower case to CAPITALS, with automatic word-wrap. Words too long for the end of a line are not broken, but transferred intact to the the next line. All this and, most important for text-formatting, all the type is shown in a What-You-See-Is-What-You-Get display (WYSIWYG for short). And, for what you get, the cost is low: only £49.00, or £41.65 for User Club members. What more could you want?

Well, the answer is more. The perfect word processor software has not yet been written, more's the pity, and Microscript has some shortcomings. But, more of that later.

Amsoft recommends the use of twin disc drives, and this certainly makes things easier. It is possible, however, to use Microscript effectively on just one drive. Microscript is not one program but five, from about 20-30K each. Depending on what you pick from the menu, only that particular one is loaded. Therefore, the working copy of your Microscript disc does not need to contain all of its parts. It is possible to split it over two discs and to 'filecopy' (using your CP/M utility disc) the documents between them. Proper management should give you about 100K to play with and, if you erase back-up copies before editing, this is more than enough for most people's neeeds. With twin discs the problem vanishes, there is the whole 169K of the B drive to satisfy the needs of everyone.

It gives me a problem, though. I really need to do five reviews instead of one. First, though, a general overview, and then I will deal with separate units.

Microscript is a CP/M based word-processor program, that allows continuous documents to be made, up to the space left available on your disc. It uses function keys (a combination of Escape or Control keys plus others) to bring into play its different editing, text formatting and other facilities. To remember all the combinations of keys is the demanding task of the user- there is no handy reference even in the manual. But once grasped, after about a week of practise, they make the whole business of producing a polished, finished document a very simple and easy process.

The five Microscript programs are:

- Creating and editing a document;
- Reformatting, including a built-in calculator and cut and paste facility;
- Global Search to replace a word or phrase with any other;
- File Management for copying, renaming, erasing etc. your masterworks;
- Printing the masterwork.

Editing

Overall, the screen presentation is good. It gives a clear, legible and uncluttered layout in 80 columns. there is no provision for 40 columns, so colour-monitor owners beware. The editing and text facilities are numerous: choice of overlay or insert mode; erase a word or line; word search; center text; automatic underline or underscore; plus many others. The cursor movements are fast, and one can move through the text a line at a time or through the entire document.

Text format is by means of rulers placed in the text, (they will not print out) they look a bit like this:

W.....I.....T.....T.....C.....T.....H.....E.....R.....G.....

or this

.....J.....T..........C..........R..........Z.........P.....

There are nine standard rulers, but you can alter these at will by overtyping - a full-stop to get rid of something, or T for tab, I for indented paragraph, C for centering, J for justified paragraph, W for word-wrap (not justified). Taking the cursor through the ruler line makes the letters on that line active. So, using a ruler like:

...................J..I..........R............................

a different format of the text can be made with no difficulty at all. This is not done completely in the editing program. For a complete tidying up of the text - with proper spacing between commas and full-stops, turn to the Reformat function.

Reformatting

Besides the tidying up of pararaphs before printing, reformatting offers 'Cut and Paste' and a handy calculator. A section of text can be cut out, held in memory, and stuck back in elsewhere. There are two types of people in the world - those who use cut and paste a lot, and those who do not. I do, and it is wonderful. The calculator can do vertical or horizontal addition - only for figures on the screen, though - and can perform full 5 function arithemetic (+, -, *, /, %) on each number, with memories. It is good, but I cannot say that I have needed it a great deal, though I dare say there are some who would find it invaluable.

Global Search

When your priceless masterpiece of prose has just been completed, and you notice the dreaded consistent spelling mistake all the way through - 'teh' for 'the', 'Amsift' for 'Amsoft', 'raving madman' when it should have been 'tax inspector'. You may go through the whole thing on edit, or you may use the Search program to find any short string and replace it with any other of your choice. That way you get it done automatically.

I had hoped that I could type in the first letter of a word and then use Search to fill in the rest - very convenient for dyslexics like myself. The string and its replacement should, however, both be about the same number of spaces, otherwise the sentence may be moved past the end of its line and a bit may be lost.

File Management

Rename, copy, erase, merge, or view documents - File Management manages files. It could be bettered if there were a command to let you know how much space was left on disc, and how long a file was. I have got round this by filecopying 'stat.com' from the CP/M utilities disc onto my working copy of Microscript, but I have to exit from the system each time I want to use it.

Printing

When it comes to printing up a sizeable document there are some things Microscript makes easy for you. Automatic page numbering, and the position and line for the page number and title can be changed.

This gives you quite a bit of flexibility. One of the things I liked was the chance to stop and start the printing from any page of the document. As I have a daisywheel printer, however, I would have liked some way to stop and start in the middle of a page to let me change wheels.

If you want to produce professional looking, lengthy documents on the Amstrad, Microscript is a must. It wins over the other available word-processing software because of the formatting features, and the larger file length that can be accomodated with a CP/M based system, usually the memory left in your computer after you load the WP program is the maximum limit on the file length - Tasword allows, I believe, 13K, but Microscript stores the file on disc as you progress, leaving lots of memory. The maximum file length is determined by the amount of space left on the disc. There are a few provisos to this that have to be taken into account.

To explain these, let us trace the course of a Microscript file. When you create a file it must be named. Let us say that we give our imaginary document the name 'B:EXAMPLE.DOC'. The 'B:' refers to the disc drive (it may be 'A:'), the 'EXAMPLE' is any old name, the '.DOC' is a generic suffix of your choice (i.e. DOC for document or LTR for letter etc.). Each time you edit a document, an Editing In Progress file, called 'EDITINP.$$$' is created. You never actually see it, for each time you save, after editing, 'EDITINP.$$$' takes the name of your document. The old file becomes an automatic back-up copy, i.e. 'B:EXAMPLE.BAK'. Thus, it is possible to have three files of the same length on your disc at the same time.

Given this knowledge, it's simple. All you have to do is find some mathematical genius, who can divide by three, and get him to work out the maximum safe file length.

Microscript also wins in its ability to be programmed, it works very much like a computer language. When a document is merged it goes through an interpreter, which can read in-built commands. Thus, it is possible to create your own specific system. You do not have to be a Numero Uno Hacker or one of the semi-legendary 'Power Users' to make use of this, I have a file called LTR.LTR. It is a standard letter heading. When I write a letter, I create a new file, and then merge in LTR.LTR. Thus, each letter starts with the telephone number and the address. It then stops and waits for me to enter the date, before finishing the rest of the letter head. My REF.LTR file puts automatic reference numbers in. But, that is all very small stuff. A whole business specific, menu-driven WP system is possible. All you have to do is write it, and if you were clever enough to buy a CPC464 that will not be too difficult.

In conclusion, Microscript is quite to very good, and very reasonably priced. However, it doesn't support super or sub-scripts, and I would like an automatic footnote facility, automatic word and/or line count during editing. I would like a few other things as well, perhaps including something that actually did all the writing itself. But, failing that, Microscript will do an excellent job. Compare the price with Wordstar, and you'll think, like me, that it does a marvellous job.

ACU

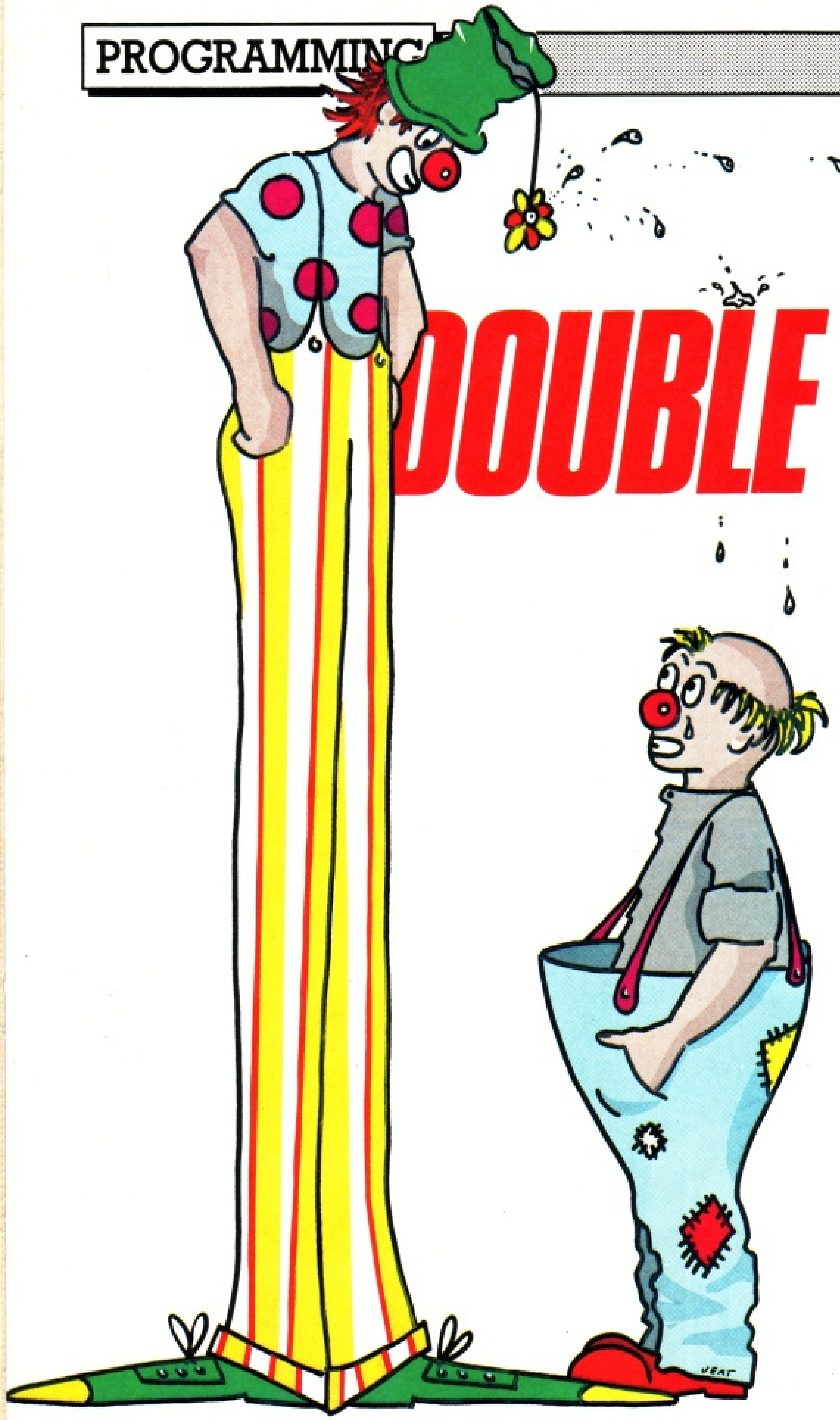
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6	COMBAT LYNX Durrell	6			3	59
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9	SORCERY Virgin	9			2	39
10	MR FREEZE BT Firebird	8	▼		1	37
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13	JET SET WILLY Software Projects	13			3	22
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15	CONFUSION Incentive	18	▲	664	1	17
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18	MANIC MINER Software Projects	16	▼	D A	3	13
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20	PYJAMARAMA Mikrogen	-	RE	664 A	1	11

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DOUBLE HEIGHT

Having moved up from owning an Oric to an Amstrad CPC464, I was disappointed to find no double height facility. Therefore I set about rectifying this omission and this resulted in a machine code routine of just 183 bytes. It is very easy to use since an extra command, DPRINT, is implemented.

The loader program should be saved for future use. The DPRINT command is initialised by a GOSUB 6000 from the main program. Note, a "SYMBOL AFTER 32" is executed within the subroutine so the main program should not contain any "SYMBOL AFTER" statements.

Once the GOSUB 6000 statement has been executed, the DPRINT command is available for your own use. To get double height text simply set up a string containing text, eg. A$= "demonstration", and use |DPRINT, @A$.

This will print the string in double height. There are one or two precautions to observe. Firstly, the double height routine uses characters 254 and 255 for its own use, so don't try to print these in double height as this will not work. Secondly, make sure that the string passed to the routine is not empty. If it is then some garbage will be printed on the screen. Other than that, the routine works very well and is very fast.

Breakdown of program

The DOUBLE HEIGHT program consists of seven short machine code subroutines. The following is a detailed breakdown of these subroutines.

ROUTINE 1

```
entry address      :  4000 (&9C40)
entry conditions   :  an ASCII character must be placed in
                      &9C5F (40031)
action             :  places the 8-byte character matrix values
                      into location 40032-40039 (&9C60-&9C67)
```

```
40000 CD 03 B9          CALL &B903          ;KL U ROM DISABLE
40003 CD 06 B9          CALL &B906          ;KL L ROM ENABLE
40006 3A5F 9C           LDA, (&9C5F)        ;GET CHARACTER
40009 CD A5 BB          CALL &BBA5          ;TXT GET MATRIX
40012 38 05             JR C 05             ;JUMP IF U.D.G.
40014 CD 06 B9          CALL &B906          ;KL L ROM ENABLE
40017 18 03             JR 03
40019 CD 09 B9          CALL &B909          ;KL L ROM DISABLE
40022 II 60 9C          LE DE, &BC60        ;DESTINATION
40025 01 08 00          LD BC, &0008        ;NO OF BYTES
40028 ED B0             LDIR                ;BLOCK LOAD
40030 C9                RET                 ;THAT'S IT!
40031 00                                    ;HOLDS ASCII CHAR
40032 00 00 00 00 00 00 00 00               ;8-BYTE DATA BUFFER
40039 00 00 00 00 00 00 00 00
40040 00 00 00 00 00 00 00 00               ;16-BYTE DATA BUFFER
40055 00 00 00 00 00 00 00 00
```

ROUTINE 2

```
entry address        40056  (&9C78)
entry condition      the 8-byte data buffer should be filled
                     with the character matrix data.
action               doubles up the contents of the 8-byte data
                     buffer into the 16-byte data buffer.
40056 01 10 00       LD BC, 16          ;COUNTER
40059 21 60 9C       LD HL, &9C60       ;SOURCE
40062 11 68 9C       LE DE, &9C68       ;DESTINATION
40065 ED A0          LDI
40067 2B             DEC HL
40068 ED A0          LDI
40070 78             LDA,B
40071 B1             OR C
40072 20 F7          JR NZ              ;GO BACK IF COUNTER >0
40074 C9             RET                ;BYE!
```

ROUTINE 3

```
entry address        40075 (&9C8B)
entry conditions     16-byte data buffer should be flled with
                     data to redefine characters 254 and 255.
action               redefines characters 254 and 255 with data
                     from 16-byte buffer.
40075 3E FE          LDA, 254           ;TOP HALF
40077 21 68 9C       LD HL, &9C68       ;FIRST HALF OF 16-BYTE
                                         BUFFER
40080 CD A8 BB       CALL &BBA8         ; TXT SET MATRIX
40083 3E FF          LDA, 255           ;BOTTOM HALF
40085 21 70 9C       LD HL, &9C70       ;SECOND HALF OF 16-BYTE
                                         BUFFER
40088 CD A8 BB       CALL &BBA8         ;TXT SET MATRIX
00091 C9             RET                ;WHOOOSH!!!
```

ROUTINE 4

```
entry address        40092 (&9C9C)
entry conditions     characters 254 and 255 should be redefined
                     to form the top and bottom halves of a
                     character.
action               prints double height character
40092 CD 78 BB       CALL &BB78         ;TXT GET CURSOR
40095 E5             PUSH HL            ;SAVE CURSOR POSITION
40096 3E FE          LDA, 254
40098 CD 5D BB       CALL &BB5D         ;TXT WR CHAR
40101 E1 E5          POP HL: PUSH HL
40103 2C             INC L              ;MOVE DOWN A LINE
40104 CD 75 BB       CALL &BB75         ;TXT SET CURSOR
40107 3E FF          LDA, 255
40109 CD 5D BB       CALL &BB5D         ;TXT OUR CHAR
40112 E1             POP HL
40113 24             INC H              ;MOVE FORWARD ONE SPACE
40114 CD 75 BB       CALL &BB75         ;TXT SET CURSOR
40117 C9             RET                ;CALL IT A DAY!
```

ROUTINE 5

```
entry address        40118 (&9CB6)
entry condition      E-register contains the ASCII code for the
                     character to be printed in double height
action               call routines 1-4 and prints a double height
                     character.
40118 7B             LD A,E             ;PASS CHAR. TO A-REG
40119 32 5F 9C       LD (&9C5F),A       ;STORE IT.
40122 CD 40 9C       CALL &9C40         ;GET MATRIX
40125 CD  78 9C      CALL &9C78         ;DOUBLE IT UP
40128 CD 8B 9C       CALL &9C8B         ;REDEFINE CHARS 254 & 255
40131 CD 9C 9C       CALL &9C9C         ;PRINT IT
40134 C9             RET                ;THAT'S ALL FOLKS!
40135 00 00 00 00                       ;4-BYTS WORKSPACE
40138 00 00 00 00                       ;FOR THE O.S.
```

ROUTINE 6

```
entry address        40139 (&9CCB0
entry conditon       DE contains a pointer to the string to be
                     printed in double height.
action               goes through the string, passing each
                     character to ROUTINE 5, the control routine.
40139 1A             LDA,(DE)           ;GET LENGTH
40140 F5             PUSH AF            ;STORE IT
40141 13             INC DE             ;POINT TO ADDRESS OF
                                         STRING
40142 1A             LDA, (DE)          ;GET POINT INTO BC
40143 4F             LD C,A
40144 13             INC DE
40145 1A             LDA, (DE)
40146 47             LD B,A
40147 C5             PUSH BC            ;SAVE IT
40148 0A             LDA, (BC)
40149 5F             LD E,A             ;GET CHARACTER
40150 CD B6 9C       CALL 40118         ;PRINT IT
40153 C1             POP BC
40154 F1             POP AF
40155 03             INC BC             ;POINT TO NEXT CHAR
40156 3D             DEC A              ;DECREMENT COUNT
40157 C8             RET Z              ;RETURN IF STRING PRINTED
40158 F5             PUSH AF            ;SAVE COUNT
40159 18 F2          JR                 ;PRINT NEXT CHARACTER
40160
```

ROUTINE 7

```
entry address        40161 (&9CE1)
entry conditions     none
action               sets up the |DPRINT RSX
40161 01 EB 9C       LD BC, &9CEB       ;ADDRESS OF COMMAND TABLE
40164 21 C7 9C       LD HL, &9CC7       ;4-BYTE WORKSPACE
40167 CD D1 BC       CALL &BCD1         ;INFORM O.S.
40170 C9             RET                ;BACK TO BASIC
40171 F0 9C                             ;ADDRESS OF NAME TABLE
40173 C3 CB 9C       JP &9CCB           ;DOUBLE HEIGHT ROUTINE
40176 44 50 52 49 4E D4 00              ;DPRINT
40182 44 50 52 49 4E D4 00              ;DPRINT
```

BASIC SUBROUTINE

```
60000 IF PEEK(40000)=&CD THEN RETURN ELS
      E SYMBOL AFTER 32:MEMORY 39999
60010 FOR i=40000 TO 40182:READ x$:x=VAL
      ("&"+x$):POKE i,x:NEXT:CALL 40161:
      RETURN
60020 DATA cd,03,b9,cd,06,b9,3a,5f,9c,cd
      ,a5,bb,38,05,cd,06,b9,18,03,cd,09,
      b9,11,60,9c,01,08,00,ed,b0,c9,00,0
      0,00,00,00,00,00,00,00,00,00,00,00
      ,00,00,00,00,00,00,00,00,00,00,00,
      00,01,10,00,21,60,9c,11,68,9c,ed,a
      0,2b,ed,a0,78,b1,20,f7,c9
60030 DATA 3e,fe,21,68,9c,cd,a8,bb,3e,ff
      ,21,70,9c,cd,a8,bb,c9,cd,78,bb,e5,
      3e,fe,cd,5d,bb,e1,e5,2c,cd,75,bb,3
      e,ff,cd,5d,bb,e1,24,cd,75,bb,c9,7b
      ,32,5f,9c,cd,40,9c,cd,78,9c,cd,8b,
      9c,cd,9c,9c,c9
60040 DATA 00,00,00,00,1a,f5,13,1a,4f,13
      ,1a,47,c5,0a,5f,cd,b6,9c,c1,f1,03,
      3d,c8,f5,18,f2
60050 DATA 01,eb,9c,21,c7,9c,cd,d1,bc,c9
      ,f0,9c,c3,cb,9c,44,50,52,49,4e,d4,
      00
```

Power to the ROMs

by Peter Green

Plug-in software is finally starting to arrive for the Amstrad computers. Here we look at the second ROM expansion card to hit the marketplace.

When the Amstrad CPC464 was launched over a year ago, one of the features which promised the most exciting possibilities was its ability to run software contained in up to 252 external 16K ROMs: that's right, up to four Megabytes of program ready and waiting at your fingertips. Apart from the 'background' ROM in the disc drive interface, which provides the controlling routines for the disc hardware, Amstrad have stayed well clear of this market, preferring to tackle disc software instead. The promise remained unfulfilled.

This was a great shame; although it can only accept a total of 16 'sideways' ROMs, the BBC Micro has seen a great explosion in the number of ROM boards and ROM software from commercial software houses. This makes the machine extremely powerful and versatile. At last it seems that Amstrad owners will be able to enjoy facilities that not only match but outstrip the BBC.

First, Arnor recently brought out a ROM expansion card containing an assembler/monitor, Maxam, with the promise of more ROMs to follow. Now Micro Power, with their experience of BBC sideways ROMs, have turned their attention to the Amstrad.

All Aboard

The Superpower sideways ROM card is cased in a grey plastic moulding (matching the Amstrad's colour scheme) which is slightly larger the disc interface and about twice as thick. The first thing I did was to open it up and examine its entrails. This is easy to do as the case halves simply fit together by friction, so that new ROMs may be quickly added. In fact it's almost too easy, and a well-used box could well become a little slack, as the review model had. However, if the lid did drop off it would be no more than irritating, since no damage could occur, and in any case, any other peripheral plugged in to the back will hold the lid in place.

A more elegant solution might have been to put the ROM sockets and the address jumper switches under a battery compartment' type of sliding lid, or a door using a moulded-in polypropylene hinge. But that would have hiked the price above its very reasonable £39.95 (plus 95p postage and packing).

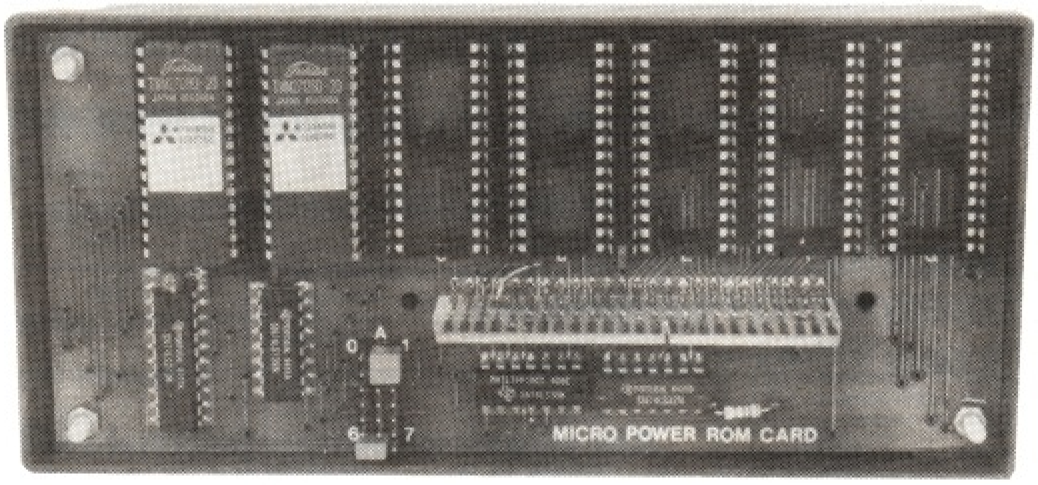
The circuitry is neat and simple. There are just seven ROM sockets, which are 28-pin types for 8K or 16K ROMs, two small logic chips, a data latch and the 3-line-to-8-line address decoder, that selects which ROM is to be used. Various ways of numbering the ROMs are permitted, and are controlled by inserting shorting plugs onto a jumper block. The manual explains how to number the ROMs so that none are missed by the firmware on power-up.

The seven extra ROMs provided by Superpower fall a bit short of the maximum possible on the Amstrad. Can the system be taken any further? Yes, by buying a second unit with a special board, daisy-chaining is possible to allow further ROMs to be added. However, the manual is a little vague as to whether only one extra board is permitted, giving a total of 14 external ROMs, or whether you can continue to the limit allowed by the firmware. Of course, if the latter is possible, you'll run into that fundamental problem for peripherals on the Amstrad: plug in enough of them and you run out of monitor cable!

The unit plugs firmly onto the expansion port connector, making a snug, flex-free fit against the back panel of the computer, and has a through-connector so that other peripherals may also be used. Unlike some manufacturers, Micro Power have remembered to cut the keying slot in the through connector, so there should be absolutely no problems in attaching other peripherals.

If you already own an Arnor board, things are a little more wobbly because that board is very deep and needs to go on the port first, so that most of its printed circuit board can lie inside the computer casing. However, that is the least of your problems. When I switched on my system, consisting of Arnor Maxam, Superpower, and Amstrad discs, the system failed to initialize the disc drive ROM, leaving me with a tape-only system.

Even when I removed all the ROMs and addressing jumpers from the Superpower board, the mere presence of both boards on the expansion bus prevented the firmware from recognising ROM 7, the disc routines. Nothing in the manual covers this possibility, as background ROMs should always be initialised regardless of the contents of Superpower sockets. Used with the Arnor board removed, everything was fine and the discs worked. Evidently there is some basic but obscure incompatibility between the two ROM cards.



OK, so can you overcome the problem by using Arnor ROMs in the Superpower board? Micro Power say yes: Arnor say no, they've scrambled the address lines. If this is the case, Arnor have gone down slightly in my estimation. It's very frustrating, when Amstrad have gone to so much trouble to make expansion of their computer easy, that other companies should make it needlessly harder.

ROM to Manoevure

At present Micro Power have two ROMs available, with others promised for the near future. The more interesting one, Disc User's Utilities, was not supplied for review, but the specification sounds mouth-watering. It will allow examination and alteration of individual sectors of the

disc, search the disc for specified data, and handle files. Access to disc utilities such as FORMAT and VERIFY are given directly from the ROM (I assume this means you don't need to invoke CP/M). As a bonus, various machine code programming aids are included, such as a hex calculator and a disassembler. Like all the Micro Power ROMs, this is priced at £39.95.

The ROM we were supplied with was MAIL, a mailing list/club membership program originally developed by Micro Power to handle their own mail shots. To access it from BASIC, you simply type |MAIL. The software then instantly takes over the machine: lovely!



Essentially this program is an electronic card file, or name-and-address book. For each entry you are allowed to split the data into parts which will appear on any address labels printed out, and parts which won't. Further, you can specify up to 20 independent 'classes', which are qualities or attributes to be assigned to each entry for classification purposes. For example, a club might use four of the classes to represent junior, senior, ordinary and life members.

Full sorting and analysis of the database is possible, for example to produce a selective mailing list before printing the address labels. The classes are used to include or exclude entries from this selection process, so if a club secretary was sending out subscription reminders, he could filter out the class of life members, who don't need to pay, and produce address labels for the rest.

The program will allow you to alter the size of the labels produced if the default doesn't suit your purposes.

Even with the software in ROM, leaving virtually all the Amstrad's RAM free for the actual database information, only about 300 records can be stored in the machine at once. However the database can be of any size, because when the machine is full, the file may be split in two and part saved to disc. This process can be repeated as often as necessary.

Another nice thing about not having the software in RAM is that extensive help messages are no longer an extravagant waste of memory. MAIL puts a help page on the screen every time you make a menu selection, so after a bit of practice it should never be necessary to look at the manual again. If they get a bit tedious, the messages can be turned off (and on again) with a single keypress.

The manual supplied was a provisional one, but more than adequate: although the section on how to split a large database into small files had my head spinning! It involves a lot of discs or tapes being swapped about, and a complicated system of file naming so you can keep track of the various levels of splitting. A rather clearer explanation, perhaps with diagrams, would be better here. The last thing you want to do with a machine full of data is experiment with the filing system!

Urgent deadlines meant I had very little time to spend with this program, but it seemed easy to learn and I found no bugs. Small clubs and companies with access to an Amstrad would find it a very useful timesaver.

Future software promised by the company for the end of September includes a programmer's toolbox, a full assembler, disassembler and monitor package, and an integrated business program set including word processor, spreadsheet, database and business graphics. Micro Power can be found at Sheepscar House, Sheepscar Street South, Leeds LS7 1AD (phone 0532 434006).

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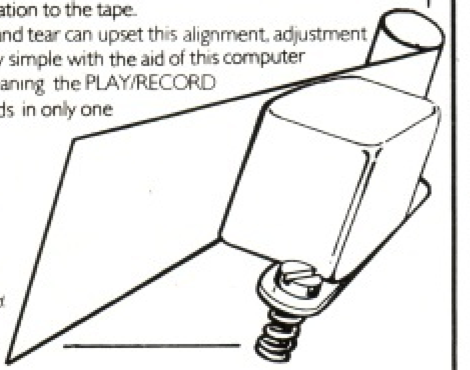
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The Unsung Heros (1)

Behind every successful computer project there stands a designer. In fact, nearly all the most famous micros have resulted from the efforts of relatively small design teams. And all the most notable camels have been the outcome of committee based design teams.

The Amstrad CPC464 was an example of small is beautiful, so here's the story of Mark-Eric Jones original design, and how it came about.

Arnold was conceived around January 1983, and in Amstrad's inimitable fashion, most of the plastic moudings had been designed and tooled by April 1983. Unfortunately, the original circuit design contractors were not schooled in "The Amstrad Way of Doing Things", and had discovered that they had bitten off more than they could chew. Meanwhile, Amstrad were champing at the bit with the tooling for the casing complete along with the prototype monitors.



Mike Scase

By August, Amstrad decided that enough was enough and appointed a new technical project management team led by Roland Perry to take over the electronic design work. After a brief examination of the original work (6502 based, 64K RAM and about as exciting a Vic 20), the circuit design was scrapped in favour of a Z80 based system.

In fact, the project management team put together hardware and software expertise with as many man years of experience on Z80 as even the most major computer manufacturters could shake a stick at. Both MEJ Electronics and Locomotive Software had also been nurturing secret desires to put their own philosophies of home computer design to the test in the marketplace. MEJ with an economy of hardware design that suited Amstrad's philosophy very well (it was considerably lower cost than the original 64K 'Vic 20'), and Locomotive, whose expertise in BASIC interpreters and the Z80 was legendary amongst the small circle that then appreciated their talents.

The Old Firm

Both Messrs Jones and Locomotive had previously worked together at a firm called Data Recall, whose Diamond Wordprocessor aquired an enviable reputation in some of the most prestigious offices of the land. Such is the way of the industry that the talent behind the project saw an independent life as a more attractive option, and set up as independent consultancies, featuring hardware and software respectively.

A network of contacts going back to University led Roland Perry to contact Locomotive Software who in turn recommended MEJ electronics, and a meeting was duly convened in August 1983 wherein the protagonists set out their plans for the project. Amstrad were impressed enough to proceed to engage the services of MEJ electronics which has subsequently developed into a close association that has led to more innovative product designs that have confounded many industry observers-cum-critics who had early reservations about the place of a volume consumer electronics specialist in a market as overtly 'techy' (a wonderful American expression meaning technically orientated) as the home/personal computer business.

Amstrad set itself a tight timetable for delivery of the first working prototypes - and also took on board the idea that a gate array should be used instead of some 35 TTL packages as in the original design.

Once past the initial hurdle of getting acceptance for the idea of the gate array, Mark Jones then managed to squeeze another 30 or so 'equivalent' TTL packages into the design -the cost difference was negligable, but the performance gains were considerable.

Bearing in mind the problems experienced by other manufacturers when attempting to employ gate array techniques, 50 prototypes were made using gate array simulators. The 'GAS' boards were the same size as the final computer board, and contained about 3 times as many ICs, although the entire contents of the simulator plugged into a one 40 pin socket on the 'main' mother board).



Mark Eric Jones

This proved beyond all doubt that the basic design worked -and ensured that models existed to enable software design to get an early start. With so many variables in a gate array, it helps a great deal to be able to be positive that any problems lies elsewhere than in the original design!

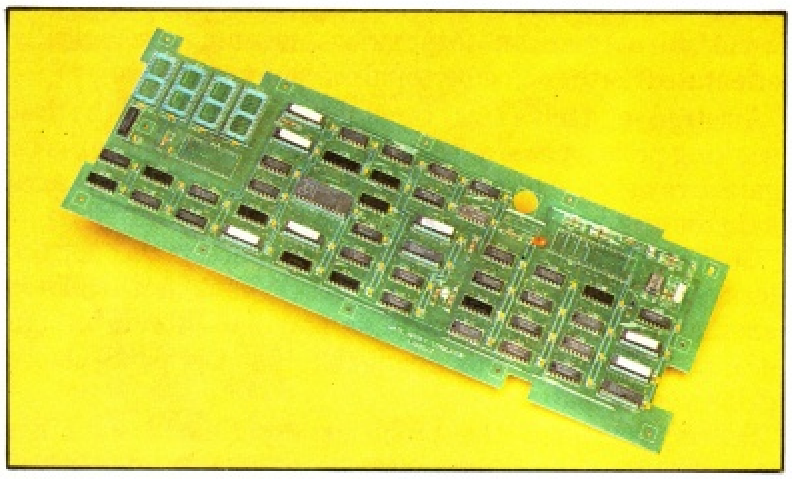
In the course of the design, Mark Jones and Roger Hurrey evolved the novel 3-bit 27 colour palette technique, and managed to keep to the overall objective of producing a computer capable being just that little bit smarter and more fully featured than the BBC model B design. A far cry from a souped up Vic 20!

On the rails

Locomotive Software saw their first working hardware towards the end of October 1983. A breakneck schedule had been maintained with the assistance of many late nights, and by the start of December, the first systems were being handed over to eager software houses.

From a hardware point of view, the design was well finished by now, although the gate array was some way from completion of production tooling.

Final Gate Arrays arrived in February. So by the time the product was launched in April 1984, everything on show was actually produced from final tooling and final masks. One supplier present at the launch remarked that it was the first time in their experience that they had attended a computer launch where the equipment on show wasn't a last minute bodge of dubious prototypes.



However, these other notable incomplete products had been the fruits of enthusiastic amateurs, not a company steeped in just what it means to be in the consumer electronics business. The distraction of 'not invented here' never impeded Amstrad's cool commercial judgement of the best way to make things happen.

With Amstrad now firmly established as the most solid force in the UK home computer marketplace, and not far from a similar position in most of Europe, it looks as if Mark Jones and his partner Mike Scase may look forward to many other opportunities to show just what can be done with legendary Cambridge technical talent coupled to the equally legendary commercial flair of Amstrad.

All the while this has been going on, the established home computer manufacturers have been proving Alan Sugar's statement at the launch of the CPC464 that the business had ceased to be a playground for companies without a thorough grasp of the commercial realities of the electronics business. Just as the UK audio and TV business had been started by enthusiastic amateurs and then passed on to commercial businessmen who in turn then abdicated in favour the Japanese, so the computer industry is evolving from infancy to maturity.

Whilst Amstrad wasn't around in force in the days when it might have been able to provide the product to stem the subsequent flood of Japanese audio goods, the combination of technology and commercial instinct will keep Amstrad computers in the reckoning for a long time yet. **ACU**



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Writing Adventures PART VI

Bill Brock

Winding up

The time has now come to wind up this short series of articles on writing your own adventure games. If you have been sitting in front of your Amstrad busily typing in the routines given over the last five issues, your own adventure game should now be nearing completion...

Unless otherwise stated, the program lines should be typed in with the line numbers as shown. This will give you an operating system to which you can then 'graft on' your own data for location descriptions, artefacts lying around verbs and objects to be recognised etc.

What has gone before is 'nearly' all you need to know, there are just a few points that we must tidy up before leaving you on your own.

Important words

There are thirteen single word input commands that are understood by the program at lines 1730-1740 (you may have added more). Generally speaking the single word inputs are fairly important commands and are those words which are most often used.

The first seven are also accepted as single letter commands, which in practise will probably be used most of all (the direction commands and INVENTORY). The final six (with the exception of LOOK) have not yet been covered at all.

Let us look at the remaining five - SCORE, HELP, QUIT, SAVE and LOAD:

Winning numbers

SCORE is something that 'you' must decide upon. I have included it at line 1000 as the condition for the main 'game loop' continuing (WHILE SCORE < 100). Players may well input SCORE at regular intervals, to see how they are progressing, are you going to oblige them with an answer?

If you are, then the variable ' SCORE' must be incremented at strategic points throughout the game i.e. SCORE = SCORE + 10. This could be added to certain lines where you consider the player has been particularly clever. For instance, if they succeed in making fire, having first obtained the tinderbox, the tinder and the steel.

If you wish the score also to depend upon certain items being taken to a particular place, you will have to have several lines like:

```
1 REM ** List - 34
1744 REM ** Score
1745 IF OP%(1)=4 AND SC%(1)=0 THEN SCORE
     =SCORE+10:SC%(1)=1
1750 IF OP%(1)<>4 AND SC%(1)=1 THEN SCOR
     E=SCORE-10:SC%(1)=0
1755 IF OP%(9)=4 AND SC%(2)=0 THEN SCORE
     =SCORE+10:SC%(2)=1
1760 IF OP%(9)<>4 AND SC%(2)=1 THEN SCOR
     E=SCORE-10:SC%(2)=0
1765 REM
1770 REM
1775 REM
1780 REM
1785 LOCATE #2,2,10:PRINT #2,"Your score
      is :";SCORE:GOTO 1500
```

Note that the lines are all in pairs. One to detect if an object is at a certain location for the first time - thereby incrementing the score. The second to detect if the object has been removed from that location and thereby decrementing the score.



If the score chosen in line 1000 is reached then the program will finally proceed to those lines immediately following the WEND at line 3000. The following lines should obviously be in the form of: "RAH, RAH, RAH - YOU'VE WON" etc.

Not all adventures have the facility to give the player a score, but it can often be a useful playing aid, not to mention the side effect of keeping the player's attention from waning.

Mayday, Mayday!

HELP is another command not always implemented in all adventure programs. If too much help is given then the game becomes too easy and the player's attention is lost. It is sometimes difficult to judge just how much to supply; if in doubt, give less or make the clue ambiguous or difficult to understand.

The 'helpful hints' are accessed from line 5000 and may take several forms. They may simply be linked to the player's location (L%) and so would look like line 5010. This is a straight clue to the use of gloves and will appear every time a clue is sought at location 7.

```
1 REM ** List - 35
4999 REM ** Helpful Hints
5000 CLS #2:LOCATE #2,2,2:IF RND(5)>0.5
     THEN 5090
5005 REM
5010 IF L%=7 THEN PRINT #2,"Gardeners us
     e them":GOTO 5095
5015 REM
5020 IF L%>35 AND OP%(9)=0 THEN PRINT #2
     ,"Better than carrots":GOTO 5095
5025 REM
5030 IF L%<10 AND OP%(30)=0 AND F%(1)=0
     THEN PRINT #2,"Good workmen...":GOT
     O 5095
5090 PRINT #2,"Seek and you may find..."
5095 GOTO 1500
```

Alternatively you may want to link a clue to an object, in which case lines 5020 or 5030 may give you some ideas. I keep my clues as short and as terse as possible, partially to conserve memory and secondly for the reasons given above.

These last two hints are intended to give the player clues to, a) seeing in the dark and, b) cleaning the sword. The latter is also linked to the flag indicating that the sword has not already been cleaned (F%(1)=0).

Once you have decided to include HELP, you may well find yourself with some pretty complex thinking in front of you. By all means include 'HELP' within those words that will be recognized but leave completing the 'helpful hints' until last. In the event of shortage of memory (or ideas), you can always have a one line response saying 'You are on your own here...'

Another ploy is to give the player a fifty-fifty chance of getting a clue with a line such as 5000. This by-passes any possible hint if RND(5) is greater than 0.5. Finally, line 5090 must be included to cover the likely event of there not being a clue for every occasion.

He who runs away

A good adventure game is not going to be solved at one sitting. Neither is it entirely fair or friendly to expect players to repeat perhaps dozens of moves or operations to get back to where they were, when they last sat in front on the keyboard.

To be able to SAVE 'the state of play', is an important utility for all adventure buffs. Not only does it save repeating oneself every time the game is played but it is another weapon in the player's armoury. If for instance a potentially lethal move is about to be attempted, it is very useful to be able to SAVE prior to moving.

```
1 REM ** List - 36
15199 REM ** Save
15200 CLS #3:LOCATE #3,2,2
15205 PRINT #3,"Press REC and PLAY then
      any key:"
15210 WHILE INKEY$<>"":WEND
15215 A$=INKEY$:IF A$="" THEN 15215
15220 PRINT #3," So it shall be..."
15225 OPENOUT "!NAME"
15230 FOR I%=0 TO 31
15235 WRITE #9,OC%(I%)
15240 WRITE #9,OP%(I%)
15245 NEXT I%
15250 FOR I%=0 TO 10
15255 WRITE #9,F%(I%)
15260 WRITE #9,SC%(I%)
15265 NEXT I%
15270 WRITE #9,C%,SCORE,L%,OB$(30),L$(13
      )
15275 REM
15280 REM
15285 REM
15290 CLOSEOUT
15295 IF V%=11 THEN 16010 ELSE GOTO 1500
```

The routine itself is quite straightforward but what you must be careful about is what data is saved. Inspect 'your' program in detail. Note down what objects are movable an what location or object descriptions may be altered as the game is played. Also record all flags that are set and any variables that increase or decrease during the game (like the score).

There is also another point to remember when using cassette files, they take up more memory than you think. This is because 4K (4096 bytes) is allocated as a cassette buffer. If you have less than 4K available when opening a file the computer will probably 'hang up'.

SAVE your program before RUNing if you are short on memory, better still set MEMORY 4K down from HIMEM so you know where you are.

Line 15205 prints the normal SAVE instruction to window #3, it is assumed that the player knows that a clean cassette tape has to be inserted first. Line 15210 simply clears the keyboard buffer and line 15215 waits for any key to be pressed. 15220 indicates that something is happening.

Line 15225 opens an output file onto the tape with the filename NAME. The suppresses the normal Amstrad cassette messages (telling you to press any key and the number of blocks loaded etc). These would otherwise be printed to window #0 and would be displayed over the top of our location description.

Lines 15230-15245 save the object class array (OC%()) and

the object position array (OP%()). Lines 15250-15265 the flag and score arrays and finally 15270 saves various variables together with location and object descriptions that alter within the game. C% us how many objects are being carried, and L% is the present location.

Line 15290 closes the file and brings the tape save operation to an end. 15295 checks to see if SAVE or QUIT (V%=11) have been input an directs the program accordingly. After SAVE, the game continues as though nothing had happend. The REM lines are for the additional flags/variables that 'you' may need to save.

Note that WRITE #9 is used and not PRINT #9, this is because some of the object or location descriptions may have commas within the text. If you use PRINT #9 then these are looked at as 'separators' and the descriptions would be truncated at that point...nasty.

Having got a SAVE command then obviously we must have a LOAD routine too. Lines 15100-15195 follow the same pattern as for the SAVE routine above, except that this time data will be read from, rather than written to, the tape.

```
1 REM ** List - 37
15099 REM ** Load
15100 CLS #3:LOCATE #3,2,2
15105 PRINT #3,"Press PLAY then any key:
      "
15110 WHILE INKEY$<>"":WEND
15115 A$=INKEY$:IF A$="" THEN 15115
15120 PRINT #3," Let it be as it was..."
15125 OPENIN "!NAME"
15130 FOR I%=0 TO 31
15135 INPUT #9,OC%(I%)
15140 INPUT #9,OP%(I%)
15145 NEXT I%
15150 FOR I%=0 TO 10
15155 INPUT #9,F%(I%)
15160 INPUT #9,SC%(I%)
15165 NEXT I%
15170 INPUT #9,C%,SCORE,L%,OB$(30),L$(13
      )
15175 REM
15180 REM
15185 REM
15190 CLOSEIN
15195 GOTO 1000
```

The VITAL thing to remember is that the order in which data is read FROM the tape must be EXACTLY the same as the order in which it is written TO the tape.

It follows that it might be 'friendly' to ask at the very beginning if the player wishes to "load a saved game?". Such a routine may be put at lines 300-325 (the previous line 300 becomes 400).

```
1 REM ** List - 38
299 REM ** Load previous game?
300 CLS #2:LOCATE #2,2,2
305 PRINT #2,"Do you want to load a save
    d game Y/N ?"
310 WHILE INKEY$<>"":WEND
315 A$=UPPER$(INKEY$):IF A$="" THEN 315
320 IF A$="Y" THEN 15100
325 IF A$<>"N" THEN 300
400 GOTO 1000
```

Very little time is saved by using this routine, as typing in LOAD when the first location is displayed is quite quick - you could probably use this memory for better things too. On the other hand it is friendly.

Escape clause

However good a game is, people have to sleep, work and eat. So, to remain 'user friendly', provision must be made for players to return to 'this world' for a few hours between sessions. QUIT is the answer.

```
1 REM ** List - 39
14999 REM ** Quit
15000 CLS #3:LOCATE #3,2,2
15005 PRINT #3,"Save your position Y/N ?
      ";
15010 WHILE INKEY$<>"":WEND
15015 A$=UPPER$(INKEY$):IF A$="" THEN 15
      015
15025 IF A$="Y" THEN 15200
15030 IF A$="N" THEN 16010
15035 GOTO 15015
```

Following the accent on 'user friendliness', the QUIT routine first asks players if they want to SAVE the game positions as of that moment (lines 15000-). If the answer is 'YES', then the program jumps to the SAVE routine at line 15200.

If 'NO' then the latter part of the 'death' routine from line 16010 is utilized to enquire if the player wants to play again, YES and the program is RUN again, NO and the program ENDs.

That just about wraps up the writing of a simple adventure game in BASIC. The operating system is all there, go to it and let us see the final result. There has only been space for a few of the Verb Repsonse routines but the examples should give you food for thought.

If you get stuck, look back over those shown, especially at the sort of conditions that have been set with those IF, AND, OR and ELSE commands.

Room for improvement

What you have already got will work, but as with everything, there are often ways in which various sections may be improved.

We are not talking about the content of the adventure, but about how the system works. So first we have got to decide what would be an improvement.

First there is the area of 'presentation'. This must always be a most important consideration, whether it be a gourmet meal or a computer program. Could we improve on the window system used?

This is partly a matter of individual taste experiment and see what better layout you can come up with. Perhaps the 'visible directions' could be in a separate window, perhaps

they should be represented graphically. There are many possibilities to explore.

Today we must obviously consider the addition of graphics. This would undoubtedly help in selling your adventure but I think you will find that true adventure players will still vote for the contents of the game, rather than for a few pretty pictures. Especially if these take more than a couple of seconds to be 'drawn' on the screen.

If the game is good and maintains interest, forget about the graphics. Any decent graphics will almost certainly have to involve machine code and that is outside the scope of this series.

Go faster code

An area that is always open to improvement is the speed that a program takes to respond to input command. This we can do something about.

There are a couple of coding changes that will speed up the response time. One is minor and was an oversight on my part (blush, blush) - a small increase in speed can be obtained by making the direction arrays N(), E(), U() etc. integer arrays -N%(), E%(), S%(), U%(), etc. Not many lines need changing but any gain is worthwhile.

On the subject of integers, the more knowing amongst you will have realised that there is no need to continually use the % sign, as we could have defined any integers using DEFINT during the lines of initialisation.

The % sign has been used to hopefully, hammer home the worth of using integer variables in the interest of keeping things going as fast as possible.

A much greater saving can be made elsewhere. Have you noticed the appreciable delay between the display of the visible exits and the printing of "What now?"? This is due to using ERASE in line 1500. This was chosen, if you remember, to reduce the likelihood of a 'garbage collection' when the variable space became full of unwanted variables.

Now the Amstrad will slow down significantly if you continually reassign string arrays, so ERASE is a perfectly valid approach.

But having replaced Q$(1) with the simple string variable Q$ (and deleted ERASE) in lines 1500 onwards. I have not had a whiff of a 'garbage collection' or anything else untowards. And, I have filled up the variable space several times over.

Try it you will like it. While you are in the mood for a few changes you may as well do the same for E$(1) in lines 1400-1440 too. Do not alter the other ERASE in line 1600 -you need that one.

The final answer to speeding up a BASIC program is to use a compiler (converts a BASIC program into pseudo machine code) but as yet I have not seen one offered for the Amstrad.

Pint pots

One problem that we all have when writing adventure games is that of too little memory. Initially the memory available in the Amstrad seems enormous but very soon we realise that there is not going to be enough.

One of the arts of a good adventure game writer is getting the right balance between descriptive text and a comprehensive plot. Each word that the program has to recognize and take action on entails a routine that again uses hundreds of bytes, it can soon disappear altogether.

There are any number of ways in which you can conserve this valuable commodity. Keep your eyes skinned for any routine or data statement that may be used for more than our purpose. Look out for any way in which you can cut down the coding for a given purpose.

A few bytes saved here and there can add up over the course of a long program, so every byte saved is worth the effort. So, although all those REMs help you initially, they take up a good deal of space.

There is one way in which you can save thousands of bytes at one fell swoop. Each DATA statement that is put in your program is subsequently to be assigned to either a variable, or an element of an array. Once it has been assigned, that program line just sits there taking up program space and will probably not be accessed again.

There is nothing to stop us having all this DATA saved as a file, separate from the main program, and then reading it into those arrays in the same fashion as we LOAD in, a SAVEd game position. The saving in memory could be anything between 10K and 20K. But remember the cassette buffer will require 4K.

You already have a routine for assigning most of the required data at lines 235-290, so if we follow this with a routine to create our main data file we are halfway there.

```
1 REM List - 40
295 GOSUB 25000
24999 REM ** Save data files
25000 OPENOUT "DATA"
25010 FOR I%=0 TO 40:REM ** Number of lo
      cations
25020 WRITE #9,L$(I%)
25030 WRITE #9,N%(I%)
25040 WRITE #9,E%(I%)
25050 WRITE #9,S%(I%)
25060 WRITE #9,W%(I%)
25070 WRITE #9,U%(I%)
25080 WRITE #9,D%(I%)
25090 NEXT I%
25100 FOR I%=0 TO 31:REM ** Number of ob
      jects
25110 WRITE #9,OB$(I%)
25120 WRITE #9,OP%(I%)
25130 WRITE #9,OC%(I%)
25140 WRITE #9,OS$(I%)
25150 NEXT I%
25160 FOR I%=1 TO 16:REM ** Number of ve
      rb synonyms
25170 WRITE #9,SV%(I%)
25180 NEXT I%
25190 FOR I%=1 TO 13:REM ** Number of ob
      ject synonyms
25200 WRITE #9,SN%(I%)
25210 NEXT I%
25220 WRITE #9,VB$(0):REM ** Dictionary
      - Verbs
25230 WRITE #9,VB$(1)
25240 WRITE #9,NN$(0):REM ** Dictionary
      - Objects
25250 WRITE #9,NN$(1)
25260 WRITE #9,AD$:REM ** Dictionary - M
      odifiers
```

```
25270 REM
25280 REM
25290 CLOSEOUT
25300 RETURN
```

Lines 25000-25300 follow a very similar pattern to those already seen in the SAVE routine above. The FOR...NEXT loops in 'your' program will of course reflect the number of 'your' locations, objects etc.

Having made these additions, SAVE the entire program under a new name - say "AAA".

```
1 REM ** List - 41
295 GOSUB 26000
24999 REM ** Load data file
26000 OPENIN "DATA"
26010 FOR I%=0 TO 40
26020 INPUT #9,L$(I%)
26030 INPUT #9,N%(I%)
26040 INPUT #9,E%(I%)
26050 INPUT #9,S%(I%)
26060 INPUT #9,W%(I%)
26070 INPUT #9,U%(I%)
26080 INPUT #9,D%(I%)
26090 NEXT I%
26100 FOR I%=0 TO 31
26110 INPUT #9,OB$(I%)
26120 INPUT #9,OP%(I%)
26130 INPUT #9,OC%(I%)
26140 INPUT #9,OS$(I%)
26150 NEXT I%
26160 FOR I%=1 TO 16
26170 INPUT #9,SV%(I%)
26180 NEXT I%
26190 FOR I%=1 TO 13
26200 INPUT #9,SN%(I%)
26210 NEXT I%
26220 INPUT #9,VB$(0)
26230 INPUT #9,VB$(1)
26240 INPUT #9,NN$(0)
26250 INPUT #9,NN$(1)
26260 INPUT #9,AD$
26270 REM
26280 REM
26290 CLOSEIN
26300 RETURN
```



You still have program "AAA" in memory, so now type in the routine given in list -40. It is quicker (and will be less prone to errors) to alter the existing lines 25000-25300. Delete lines 170, 235-290, 10000-4200 and lines 24999-25300. That is quite a lot of deletions, so you can begin to see where this big memory saving is coming from.

Now SAVE this program onto the beginning of a new tape as "BBB" (or whatever you wish to call 'your' program. BUT when the tape stops, DO NOT rewind it.)

You now have to reLOAD "AAA" and RUN that, but this time SAVE your 'datafile' onto the tape that onto the tape that has "BBB" at the beginning.

You will then have the main program "BBB" with the associated 'datafile' immediately following it. To run the program press SHIFT/CTRL/ESC (to clear the machine) and CHAIN "BBB" and away you (or the players) go.

Obviously you can only perform the above operations once you have finalised ALL your locations, objects etc. Also to make use of the extra memory, you must RUN program "AAA" to SAVE your 'datafile', WITHOUT all the 'action routines' (lines 5000-9999) finished. These can then be added prior to SAVEing the final version of "BBB".

This may call for a bit of tape juggling and merging of programs but for the significant gain in memory it could very well be worth it.

This is one slight snag to loading data into the main program in this manner and that is: what happens if the player quits and wants to start again? If you RUN the program as in line 16030 then the 'datafile' will have to be loaded again.

One way to cut down on this loading time is to recommend to players that they SAVE their position very early in the game and instead of RUNning in line 16030. direct the program back to somewhere like line 15100. The saving, being that there is no need to reload the data for most of the location or object descriptions or words recognised.

This is a little tiresome but several commercial programs have the same problem; do not, however, offer this way out.

All the routines given here will work if you are using a disc drive but you will have to tailor the "Press PLAY" type of response. Also if using a disc, loading time is so short and access being random, the QUITting problem mentioned above disappears.

Penultimately

There are other ways of reducing the memory requirements for a long adventure program - one such is to 'crunch' all your text. The idea being to recognise a number of often occurring character strings and replace these with a single 'code character'.

This technique is often used in commercial software and can readily (although laboriously) be done to 'your' program. Perhaps we could follow this up in a future article.

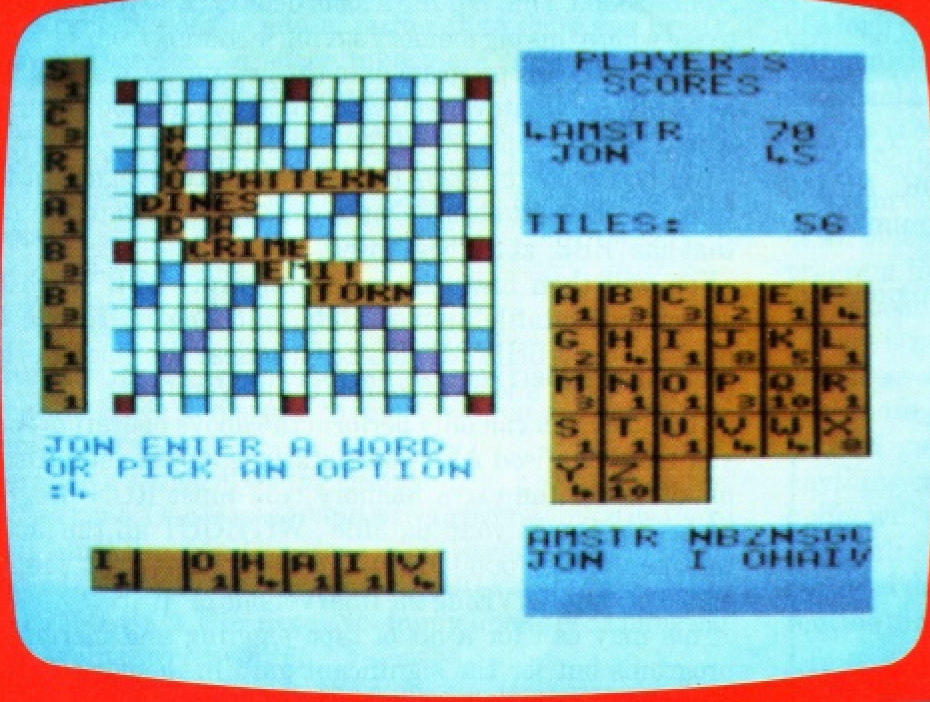
Ultimately

I hope that enough examples of the various routines have been given to enable you to complete 'your' adventure. We look forward to seeing them.

Just do no forget to remove those 'programmers friends' that were at lines 9-90, or 1299-1320 that told you, the designer, which location you were at.

ACU

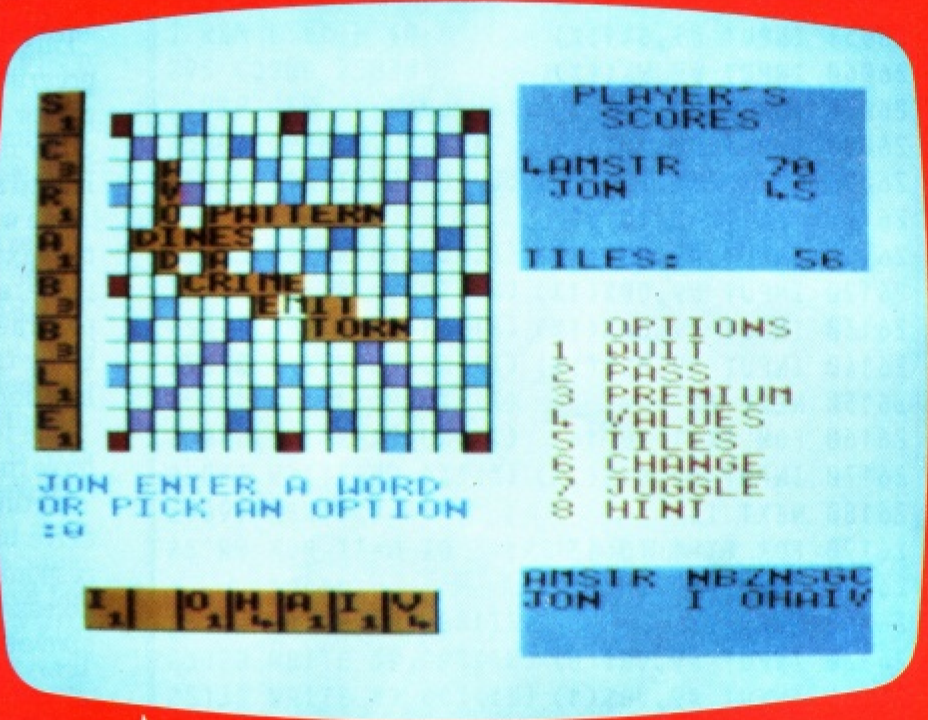
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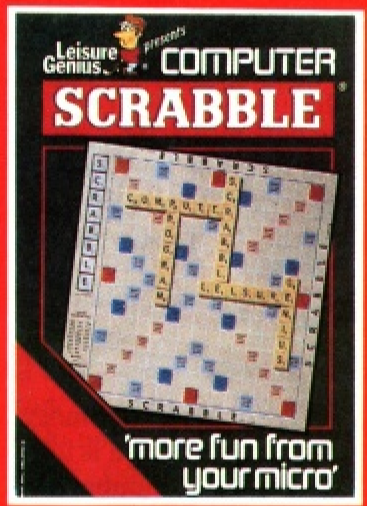


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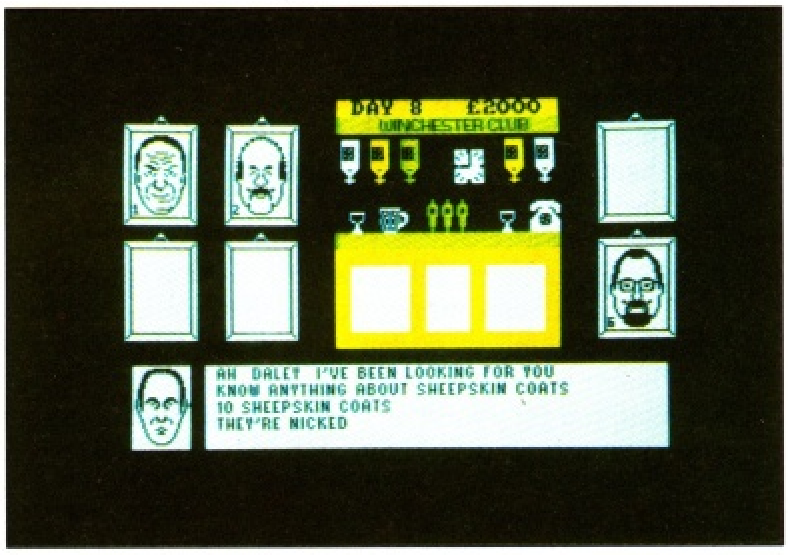


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SOFTWARE REVIEWS

Minder

You all know the TV series (a quick word in your shell-like, the next series is destined to be the last) so the game of the show should have a fairly familiar ring to it. This is the DK'Tronics straight up honest guv with none of yer fancy loaders and loading screens version, in conjunction with Thames TV. The plot is as usual but with you as the budding Arthur Daley and a rendition of 'I Could Be So Good For You' constantly in the background. You graft hard all day trying to grasp a few honest (well, almost honest) quid to take back



to 'er indoors. The day starts early, off in yer jam jar, your pockets heavier by two grand, to pull a quick deal with a regular dealer before the rub-a-dub (the highly esteemed cultural centre, the Winchester Arms) opens.There you try to shift such exotic wares as rubber suits, naughty magazines and ejector seats which have all parted company with the back of a lorry. If you can think of something to do with a rubber suit, a naughty magazine and an ejector seat, send your reply on the back of a five quid note to The Editor, c/o Amstrad User. A two pound prize will be awarded to the best reply on an official entry form.

The characters in the game tend to keep to civilised hours -you will not find them willing to answer the door after closing time. They also remember you from last time. If you offered them 25p for a rabbit hutch they get their wind up and give you the big 'E'. Next time you are lucky to be given the time of day. When it is open, the pub is a good place to pull deals but each chat takes an hour and you may not wish to rabbit with some geezer about the quality of his garden gnomes.

Worse still, Sgt. Chisholm frequents the boozer and if he catches you with any nicked goods he will ask you to accompany him to the station (I don't know it officer, you hum and I'll play along). The good natured copper is easily swayed into believing you are innocent by a generous donation to the police benevolent fund.

Terry is sometimes at the pub and you can get him to pick up goods, take them to the lock-up or deliver them. He can even be your minder. A word of warning at this point, do not get nasty with the customers. Not only are they not all playing the same game as you but if you monkey with them they can get violent. This is not a pretty sight because they are bigger than you.

The idea is to fill your pockets, not the lock-up, so try to shift stuff as fast as possible. In true Arthur Daley style, there is nothing to stop you flogging goods you do not yet have. I like the way the mouths move on the characters as they speak, a nice touch. The problem is, to speak to them you have to hit their number within a few seconds of seeing them. This game does not suffer from the 'I don't understand' problem of most adventure games. If it does not understand you it spouts sales patter. Good game, could be a nice little earner.

Author	DK'Tronics
Format	Cassette
Price	£9.95
Graphics	***
Playability	**
Addictiveness	***
Overall	***

Beach Head

By U.S. Gold, all American software, just like Mom used to make. This is a suitable sort of review this close to the independence of America day, even if the headquarters is in Birmingham.

And now a plea to all software writers from the heart: please, please put the instructions in the game. We reviewers frequently get games in pre-production packaging. If a neat feature is not obvious and we cannot find it then it does not get a mention.

The game is disc based and can afford to load title screens. This one soon disappeared in an impressive confused flurry of graphics to give a choice of difficulty levels. I decided to be easy on the machine and play on level one. First scene is a map of a bay, you have to make it into a sheltered spot in that bay and land an attack force. This is easier said than done. You are bound to get spotted by the enemy aircraft who home in on you and battle stations sounds. One quick flurry of graphics later, you are looking over the barrels of a couple of guns and an aiming computer at a fleet of ships and a few planes droning over them. I am not sure who the ships



belong to but they are not doing much anyway. The planes get bigger and noisier and come towards my guns. I wonder if they will be friends with me? There goes a wonderful relationship. To fire back, you line up on the plane, adjust the angle of the guns until they look right and fire off a few rounds. The guns are quick-firing but do need to be topped up from time to time by some invisible armourer. He is a speedy little chap and you do not really notice him unless you are of the gunfight-at-the-OK-coral mentality who believes in filling the air with lead.

After dealing with the planes you return to the map in yet another flurry of graphics and try to land again. No chance, this time the famous graphicy swirl deposits you in the midst of an enemy fleet who immediately recognise you as the smart Alec who shot down all their planes and earmark you as an instant moving target.

Fortunately, you can shoot at them. Unfortunately, they fire back. You do your bit by lining up on the target, as per the plane shoot, and fire a shell. Your battle computer is very smart and tells you if you are under- or overshooting your mark. It even tells you the odd occasions when you hit anything.

Let us assume that you are lucky and make it this far. You have singlehandedly blown up or otherwise mangled the entire enemy airforce and navy, so why not go for the army too? Good question because this is what the next scene is about.

It is recognised that you are not superhuman so you are given several tanks to do the job. These start off on the shore and move forward one at a time. A design fault in these tanks means that you cannot stop going forwards and that the gun points dead ahead whichever direction the main body of the tank is pointing.

After dodging all the mines, trenches, barricades, minor gun emplacements etc. you get a crack at the really big gun that is causing all the trouble in this part of the world. It is very big and will home in on you quite quickly, but no way is one tank load of shells enough for demolishing it anyway.

After you have failed to do this, you put your name into a relatively modest high score table and have another go - and another and another. A smaller screen than the Commodore version and the colours could have been selected better but this game has interest.

Author	Amsoft/US Gold
Format	Disc/cassette
Price	£13.95/£9.95
Graphics	***
Playability	***
Addictiveness	***
Overall	***

Airwolf

Have you ever wondered what it would be like to fly a helicopter through the caves at Wookey Hole? Daft question really, but this is the general idea of Airwolf. You are in a chopper with an unlimited supply of guns and bombs but a limited supply of rotor blades. When you have smashed up all your magical, self-replacing rotor blades you come to grief and the game starts afresh. This is not much of a problem as the game only has one difficulty level. The basic rules of the game are: don't touch it: if it's blue, shoot it. if it isn't blue, shoot it anyway. Get the picture?



I do not wish to hound this game but it is horrendously difficult to play and to get beyond the second barrier I had to delve into the black art of machine code and find the infinite life poke. Touching anything takes off one of your rotors whether you hit it top or bottom. There are also other bits of scenery, such as radar scanners, that swipe all your lives if you hit them. Maybe it is my imagination, but you seem to stick to the roof for a disparingly long time and lose an awful lot of rotors in the process.

You take this game a screen at a time. By this I mean that as you leave each screen the complete new screen scrolls on. One annoying point, after you have spent a few minutes happily blasting a way through a barrier and move to the next screen, you get a surprise when you move back. In your absence, some clever soul has rebuilt the wall. This means that you cannot rush through all the tricky bits and then come back for the very tricky ones.

To sum this game up, it is difficult in the extreme and is not fantastically innovative.

Author	Amsoft
Format	Cassette/Disc
Price	£8.95/£12.95
Playability	**
Graphics	***
Addictiveness	**
Overall	***

Danger Mouse in Double Trouble

'Crikey DM, we seem to have got ourselves in a computer game now' 'That's right Penfold, The power-mad Baron Silas Greenback and his band of international villains have been making an android of me in their jungle hideout. We've got to disable the android mouse to save the world (again)'
'Oo Eck....'
Exit the dynamic duo stage left.

First, our heroes must reach the jungle in DM's aero car. A various assortment of robots try to hinder this task. These robots have to be removed by selecting a picture of it on the repeller VDU display. If they match, the repellent tune is played and the robot disappears, DM is after all a hero of the young, and mindless destruction of the bad and just plain evil is just not on.

Once the jungle is reached DM and Penfold must negotiate swamps by using crocodiles as stepping stones. Other perils also lurk here, monkeys, mouse eating pumas and snakes.



When a puma appears DM must climb to the top of the nearest tree and do a Tarzan call to summon help. What follows next is probably the biggest cop-out in the (short) history of computer graphics, but I will spoil not the surprise by spilling the beans. With the puma out of the way our duo can continue on their way through the jungle.

Finally the Baron's jungle hideout is reached. Baron Greenback controls one side of a 4 x 4 matrix and DM an adjacent side. DM must push one of the four buttons on his side of the grid when a cell which intersects on the button the baron is pressing is yellow. If he gets it right the chain of yellow light is reduced by one, otherwise one is added. When all the lights are extinquished the android mouse is disabled and the world can sleep easy in its bed.

The game is fun to play, the children certainly enjoyed it. I get the distinct impression that the game was programmed by commitee, the three sections are quite different in feel. In the first section the psuedo-sprites are multicolour and the game easy, whereas in section two the graphics are a lot less inspiring with single colour sprites but the game is harder to play. The programmers had sufficient sense to use palette/mode switching and other tricks of the trade so I do not think this was a lack of skill, probably an expired deadline or lack of thought.

Author	Creative Sparks
Format	Cassette
Price	£7.95
Graphics	****
Playability	***
Addictiveness	**
Overall	***



Moon Buggy

This game has been around before but never with such chunky graphics. Although it shows off Amstrad's colours nicely and has three different scrolling levels of landscape, the whole feel of the game is somewhat 'chunky'.

The plot is a simple one: you roll along a scrolling landscape in a buggy resembling a six wheeler C5, blasting boulders, leaping gaps and shooting rockets that fly overhead for the only purpose of dropping bombs on you.

You can come to grief by meeting a bomb, a carelessly placed boulder or by flying into a pothole worse than any to be found on the A10 arterial. Unlike the arterial where the coppers object to litter being thrown out of the car, the use of weaponry to remove obstacles is permitted. Tough luck for obstacles but good news for moon buggys. Now the bad news; it is not possible to fire a missile in any direction if you are in the process of boulder leaping and guess where the majority of boulders are? You've guessed, just after the potholes. Bad news for moonbuggys, good news for boulders.



On colliding with anything unsavoury, the chassis of the buggy stops dead and does a badly moulded blue jelly impression while your wheels carry on into the distance, curiously travelling through boulders and turning them yellow. How come they make it through and I don't? Like I said, the boulders can be blasted with rockets, to fire these, you press the fire button or whatever the keyboard equivalent is and zap! Out fly two missiles. One goes up to miss the anti-social rockets flying overhead, while the other one flies along the landscape and turns big rocks into little ones. Life is real tough for boulders.

Still, if you can keep this up for long enough you get to the next zone. Your intrepid reviewer showed a marked tendency to drop off and hence crash before getting that far but maybe this is just his lack of prowess with a joystick. The high score table was not beyond me however and I managed to displace a few perfectly harmless comments on Jack Tramiel and poor old Sir Clive.

This game was not very absorbing to me but then I never got beyond level one so there may be some goodies in there if you can hunt them out.

Author	Anirog
Format	Cassette
Price	£7.95
Graphics	**
Addictiveness	***
Playability	***
Overall	**

Freddy Bears Picnic

'Freddy bears pic-nic, an adventure for 4 to 7 year olds' states the label well, more of an electronic story book really. The purpose of this is to help Freddy Bear arrange a picnic. The story starts with an instantly forgettable tune, obviously the music to 'Teddy bears picnic' is not yet out of copyright. A series of questions are asked; who should come to the picnic?, what should they eat? etc. The required answer is fairly obvious and if the 'wrong' answer is given you have to start again from the beginning. At this point you start to realise that the turgid tune is a punishment, and not a reward.

The program was converted from the SHARP MZ-700 computer, and has not travelled well. The 'animated graphics' promised on the front sleeve turn out to be block graphics of the type that used to be acceptable 5 or 6 years ago , but looks rather dated today.

When my eldest daughter started school, able to write quite well having made the transition from my computer keyboard to paper, I was not held in high regard by the teachers because she could only write in upper case. This mistake is repeated here as all the text is in capitals.



The child/machine interface is very simple, just using three keys or the joystick, but for some reason the input is very haphazard. The required key has to be held down for at least half a second before anything happens, and then auto repeat sets in. This makes it difficult for children to select the 'right' option, and usually results in them having to re-start from the begining.

All in all, the program could be considered quite good if it came free with a packet of corn flakes or was less than £2, but as it is, it can only be considered below average to average.

Author	Micro-Wish
Price	£3.95
Format	Cassette
Graphics	**
Playability	**
Addictiveness	**
Overall	**

Rally II

At last, a half decent car racing game has appeared for the CPC machines, unlike the, dare I say it, diabolical, Grand Prix Driver, this game is very playable and equally addictive. As with any game of this genre, the road is seen



snaking off into the distance and your job is to react to the sudden sharp bends and hazards that come towards you. Unlike some games of this type that are available on other machines, it is not just a case of you against the clock - there are plenty of cars to battle against - they may all look very similar (not unlike white Audi Quattros seen from the back) - but they do wonders to liven the game.

Control of the car is via the joystick. Left and right are obvious, there is no control, however, over the acceleration. The car steadily accelerates until either it reaches the top speed (which, thankfully is not unplayably fast) or until the brakes (FIRE button) are used. The best technique seems to be to allow it to reach top speed and continue at that until a tight bend or another car approaches. A little braking while manoeuvering followed by acceleration to top speed out of the bend or past the car will usually do the trick. Underestimating how tight a bend is causes the car to ride on the red and white striped kerbing for some time - losing valuable time.

Distance to the end of the current stage and the time remaining for the stage are shown by two bar graphs at the top of the screen. The idea is that you should make the full distance before the time runs out. Failure to do so will result in disqualification, while succeeding allows you to go on to the next stage. Too much braking or riding on the kerb will cause the time to ebb away, while, each car passed adds a little to the time remaining gauge. There are nine distinct stages to the game, completing them all will allow access to the high score table.

Having completed the game, one might think, like so many other games, that there would no longer be any challenge and the game would be hidden away in some dark cupboard never to be seen again. This is where RALLY2 really scores when compared with many other games, once you become bored with the game, you can redesign the layouts of each of the stages. Virtually everything is variable: length, number of bends, degree of curvature, left or right, back drops. Editing is done purely with the aid of the joystick and could not be simpler. The backdrops include 'sunny', 'bridge', 'sea-shore', 'night', 'desert', 'snow' and the fiendish 'fog'. The tracks you design in this way can then be saved to tape. Disc users should note that their tracks are also saved to tape, NOT disc. This is, however, not a major disadvantage, it does not take very long and saves cluttering up valuable disc space with one million and one old layouts.

Continued on page 64

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JET SET WILLY

Hacked by Chris Wood & ZZKJ

At last, as promised, the full map and playing tips for Jet Set Willy. It is over a year since this game was first released for the Spectrum computer, the CPC conversion was well worth the wait. With 134 rooms as opposed to the original 61 it is even more of a challenge, and it was no push over before. The programmers have added so many nice touches along with the rooms that it makes this one of the best CPC games around, although one unfortunate flaw is the fact that it doesn't work on the CPC 664. Well you can't have everything.

The pair of programmers are obviously Trekkies, when you get into the space ship in the Rocket Room you are flown to the Docking Bay in a series of rooms that look suspiciously like the Starship Enterpise. As you wander around it you become sure that is exactly what it is. With rooms called 'Captain Slog' (Captain's Log), Aye 'Appen (Aye Captain), and 'Beam me down Spotty.' The Sickbay is there, with someone being very ill, those cuddly creatures the Tribbles are there, blocking up the service ways to the engines. Although as the Enterprise's number was NCC 1701 and not NCC 1501 maybe it's another ship of the fleet, and that is why there is no Mr Spock. The Cartography Room is very clever; when you first arrive it is impossible to collect the object, but for every room you visit an extra block is added to the room layout until you can climb up to collect it. Lots more parts from the Starship are all rooms, and all in the right places too, the Defense System, the Photon Tube and at the front of the ship, 'Beam me down Spotty' which teleports you to a small planet surface.

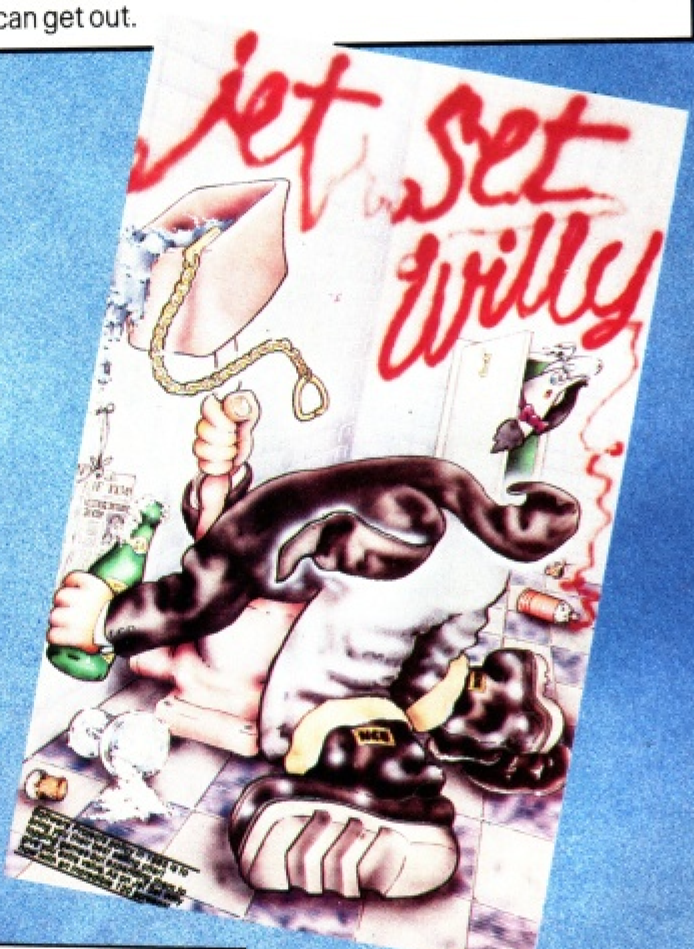
Enough about the good bits,down to some playing tips. I must thank Jeremy May from Devon for his map and tips for some of the rooms. He mapped it out in quite a short time with only the standard eight lives! I had problems with infinite lives until I found some useful pokes. More of those later.

One room that is very difficult is 'Decapitare'. It is very easy to lose all your lives in one go as you get stuck in a dangerous place. The way to do this room is to wait until the first sprite is near the bottom of its travel, on the way down when you jump up to it, using the hold key helps for timing here.

On the planet surface can be found three rooms called 'INCREDIBLE','BIG HOLE' and 'IN THE GROUND'. It is very difficult to get through these rooms to one called 'The hole with no name'. When you do, halfway up the right hand wall is a hidden entrance to the 'Secret Passage' this is the only way of getting the three objects in the left hand side of 'The Hole with no name', as you can see from the map, the rooms join on to each other either side. In the 'Foot Room' you must collect the top object before the lower one, as the foot comes down and blocks your exit from the room.

To stop the arrows on the 'MAIN LIFTS' (1 to 3) from hitting you, stay to the right as you are carried up through the ship. Getting from 'Banned' to '(Flower) Power Source' is achieved by waiting to the far right on the THIRD set of blocks up, until the sprite is about an inch away and coming towards you. Getting the object 'In the Drains' means losing a life, you must jump up to the object, collect it, then walk into the periscope, you die and are put back in a place where it is safe to walk out from.

Do not drop out the bottom of the room called 'Down T' Pit' as this takes you to 'Water Supply'. There is no way out of this except down through a room called 'Well' which leads to certain death. You have to press ESC and start again if you are unfortunate enough to fall in here. There is a similar occurance below 'Highway to Hell' where you fall into 'Entrance to Hades', but at least when you die you are put back in Highway so you can get out.



JET SET WILLY PLAYING TIPS

Timing is of the essence in many rooms, and also in order to jump a gap, Willy must be hanging on to some of the platforms by his heels. In these places, using hold is invaluable, you must press the jump key a fraction of a second before the direction key or you will usually walk off your platform to a sticky end. To climb the ropes you must jump onto them and then try to 'walk' against the direction they are swinging to go up, not all ropes lead to new rooms however. The rope in the Cold Store takes you to 'The Sewers' and you must jump quickly on arrival to avoid a fast sprite. Two rooms to be careful in are 'The Forgotten Abbey' and 'Library', the

only thing you can do here is practice a lot. In the Crypt you must flick a switch at the top of the room before one of the sprites will allow you to leave the room. In 'Rigor Mortis' as soon as you collect both the objects two stationary sprites start moving so you must jump quickly. Another awkward room is 'Star Drive (Early Brick Version)' this seems impossible to get out of because it is all made of conveyor belts which walk you into the room. To get out of here you must get onto the third platform up, on the right hand side, and jump across to the third conveyor belt up and walk quickly out, jumping up and not stopping or you will be turned around as the conveyor takes control again.

There are several rooms you will not normally see. One is called 'Deserted Isle' and to see it you must do as follows:

Get down to the room called 'Trip Switch', which is below the house, set the switch, and then travel through twenty nine rooms, including 'Decapitare,' all the way back to 'The Bow'. That is hard enough but you must do it all without losing a single life. Not easy,but it can be done. You then collect the object in 'The Bow' and then the object in 'The Yacht'. This is a very difficult one and the hold key comes in useful here. You must wait until the monster has just turned to the right and follow him as closely as you can to the object. When you have got the object you must turn as quickly as possible because the monster turns very fast. You are then transported to 'Deserted Isle'. The way you go there is another of the nice touches that makes this game so much fun. On the Deserted Isle it is just a matter of collecting an object and waiting to be rescued. There is also a room called 'The Central Cavern' which was holding up our map making until we found you only get to it when you collect all 175 objects, and go to the 'Master Bedroom' to try to go to bed. You can't play this room unless you use some method of cheating as I will tell you later. On the subject of cheating, there is also a room called 'cheat' which of course you can't get to without cheating!

Now for some pokes to allow you to more fully explore the game. Some of you may be as bad at playing it as I am, so my hacking companion ZZKJ,and I have written two programs for you. The first is for those of you who may only want a little help and want to dive straight into the game without having to type in the larger program, although I think you will find it worthwhile.

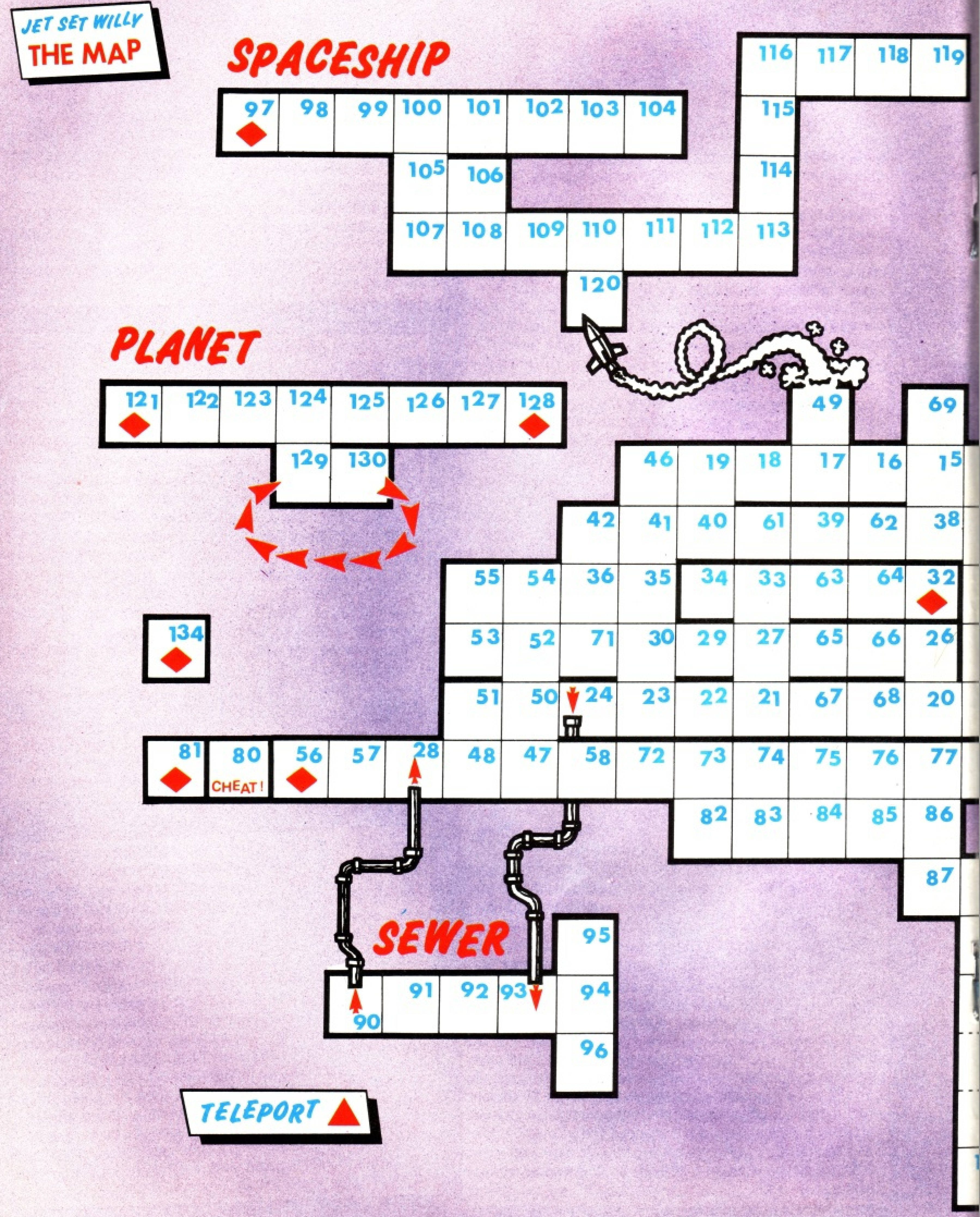
Type in, and save, the first program. This will give you infinite lives, enable you to start in any room in the game, and also select the number of objects you need to collect before finishing the game. You will obviously find that setting the latter to a small number, say one, will make life easier for you. Normally you have to collect 175 which is a bit much for me. I have changed a part of Jet Set Willy to allow you to break out of the loop the game goes into when you sometimes get stuck in the same position as one of the monsters, otherwise with infinite lives you would have to turn off the computer and reload the game. Change the values of 'obj' and 'room' in line 10 of the program to those you want or leave them as they are for a normal game with just infinite lives. Remember not to set the number of objects to a number larger than 175 or you will never be able to complete the game! If you set a starting room larger than 134 you will probably crash the game. You must be careful which rooms you chose for this because your position that you start from in the first room is not changed and you could end up trying to start in a wall and not be able to move, but used carefully it can be useful. Try 109 and start in the Cartography Room.

The second, much larger program is very useful and complicated and does lots of weird and wonderful things. It supplies just about every hacking feature you could ever think of, and a few you probably wouldn't. As before, type it in and save it. If you now look at the lines from 300 onwards you will see several REM statements in the data,these each refer to the lines after them and I will explain what they mean. Line 320 generates the same invincibility feature as it did in the smaller program, and if you don't want this feature then you delete line 320. The same is true of all the other lines, delete the data for the features you don't want before you run the program. Lines 340 and 350 are self explanatory and are the same as before except you must change the last number in each line to the one you want, the same rules as before apply, although here you must type in a number that is one less than the room you want if you change it.

The next line is for those of you who would just like to play the game normally but with a bit more of a chance,and this is useful if used with line 400, which allows you to fall as far as you like without dying. If you use line 420 then that means that all those little objects and parts of floors that kill you can now be totally ignored,unfortunately this allows you to fall through them and if you tried to go off the Bow or stood on the ones in the Galactic Invasion room (room 122) and several others, you would fall of the bottom of the screen and come back on the top again and again and again. . . so you really need line 440 which allows you to stand on these objects and that means you can walk on the water . If you are really hopeless at the game, then the next poke is for you. This allows you to walk through all the mobile monsters without so much as a bleep! Or if you want to be really silly you can turn them all off with the next line! This does not affect the ropes or the lifts.

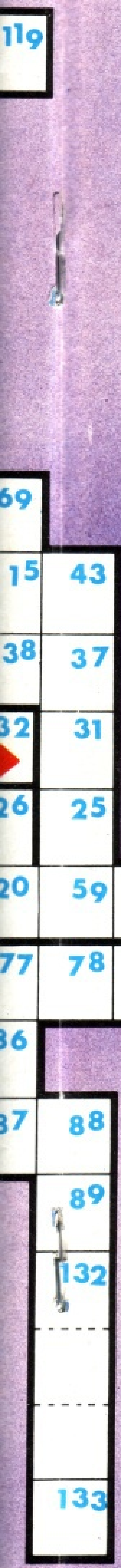
The next poke allows you to play the final room instead of just jumping on the spot but you can't actually get out of the room when you collect all the objects. This also allows you to walk in the room called 'cheat' which you will find if you walk off the Bow and on the water with the appropriate pokes. Line 520 means that you don't have to set the trip switch before you visit the Yacht and go to the Deserted Isle, and the last line is so that Basic knows where the end of the data is so don't leave it out.

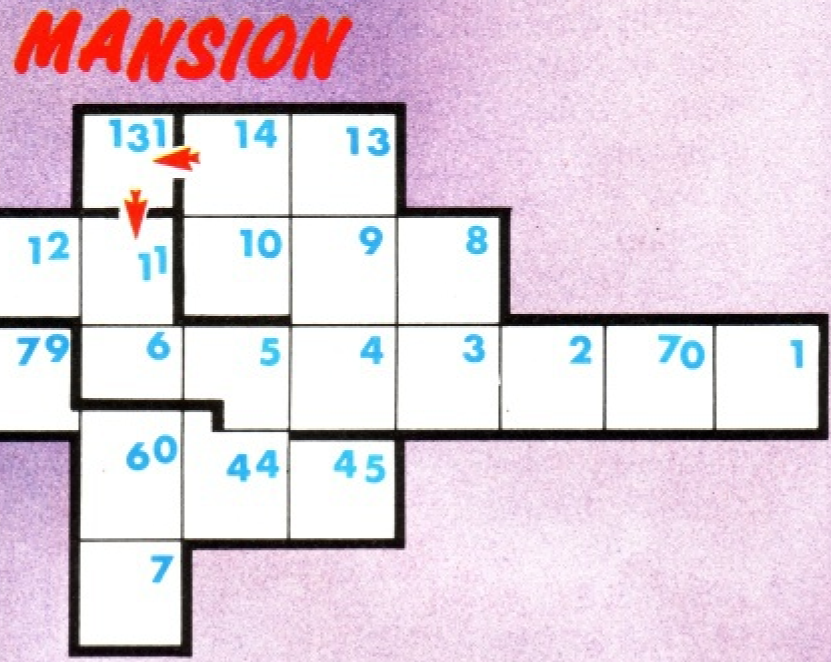
You may think there could not possibly be more, and you would be wrong. The final *pièce de resistance* is... a teleporter. I have been told that there are rumours of a very limited one hidden somewhere in the program but I couldn't find it, and it would only allow you to go to a room if you were in the Cartography Room but couldn't get back. This one however is different! written by my friend ZZKJ while I was looking for the above pokes, it is the ultimate in user friendliness. All you have to do is press the 'T' key at any point in the game and the game will stop. You then type in a three digit number and are instantly transported to the room of your choice. If you materialise in an unsafe place, and are killed you will be put back in the room you came from. Any numbers greater than 134 are ignored, and if you enter a number greater than 256, then 256 is repeatedly subtracted from it until it isn't (mod 256) and so for instance 888 will send you to 120 and 666 will not send you anywhere, so if you stay within range you will not get lost. if you press 'T' and do not want to teleport then enter 000 (or 666 for that matter) and you will stay where you are. Happy exploring.


JET SET WILLY
THE MAP
SPACESHIP
97 98 99 100 101 102 103 104
105 106
107 108 109 110 111 112 113
114 115
116 117 118 119
120
PLANET
121 122 123 124 125 126 127 128
129 130
134
49 69
46 19 18 17 16 15
42 41 40 61 39 62 38
55 54 36 35 34 33 63 64 32
53 52 71 30 29 27 65 66 26
51 50 24 23 22 21 67 68 20
81 80 56 57 28 48 47 58 72 73 74 75 76 77
CHEAT!
82 83 84 85 86
87
SEWER
95
90 91 92 93 94
96
TELEPORT

JET SET WILLY
THE ROOMS

1 The Off Licence
2 The Bridge
3 Under The MegaTree
4 At the foot of the MegaTree
5 The Drive
6 The Security Guard
7 Entrance to Hades
8 Cuckoos Nest
9 Inside the MegaTree
10 On a branch over The Drive
11 The Front Door
12 The Hall
13 Tree Top
14 Out on a Limb
15 Rescue Esmerelda





16 I'm sure I've seen this before
17 We must peform a Quirkafleeg
18 Up on the Battlements
19 On the Roof
20 Ballroom West
21 To the Kitchens' Main Stairways
22 The Kitchen
23 West of Kitchen
24 Cold Store
25 East Wall Base

26 The Chapel
27 First Landing
28 The Beach
29 Nightmare Room
30 Banyan Tree
31 Half way up the East Wall
32 The Bathroom
33 Top Landing
34 Master Bedroom
35 A bit of Tree
36 The Orangery
37 Priests Hole
38 Emergency Power Generator
39 I mean even I don't believe this
40 The Attic

41 Under the Roof
42 Conservatory Roof
43 On top of the House
44 Under the Drive
45 Tree Root
46 Nomen Luni
47 The Wine Cellar
48 Tool Shed
49 The Watch Tower
50 Back Stairway
51 Back Door
52 West Wing
53 West Bedroom
54 West Wing Roof
55 Above the West Bedroom
56 The Bow
57 The Yacht
58 The Forgotten Abbey
59 Ball Room East
60 Highway to Hell
61 Hero Worship
62]
63 Macaroni Ted
64 Dumb Waiter
65 Study
66 Library
67 Megaron
68 Butlers Pantry
69 Belfry
70 Garden

71 Swimming Pool
72 Trip Switch
73 Willy's lookout
74 Sky Blue Pink
75 Potty Pot Plant
76 Rigor Mortis
77 Crypt
78 Decapitare
79 Money Bags
80 cheat
81 Deserted Island
82 Wonga's Spillage Tray
83 Willy's Bird Bath
84 Seedy Hole
85 The Zoo
86 Pit Gear

87 In 'T Rat Hole
88 Down 'T Pit
89 Water Supply
90 The Outlet
91 In the Drains
92 Nastie
93 Main Entrance
(the Sewer)
94 Holt Road
95 Mega Hill
96 Downstairs
97 Beam me down Spotty
98 Captain Slog
99 Alienate?
100 Ships Computer
101 Main Lift 1
102 Phaser Power
103 Sickbay



104 Foot Room
105 Defence System
106 Main Lift 2
107 Photon Tube
108 Main Lift 3
109 Cartography Room
110 Docking Bay
111 NCC 1501
112 Aye 'Appen



113 Shuttle Bay
114 The Trubble
with Tribbles
115 Someone Else
116 Maria in Space
117 Banned
118 Flower Power Source
119 Star Drive
(Early Brick Version)
120 Rocket Room
121 Teleport
122 Galactic Invasion
123 INCREDIBLE
124 BIG HOLE
125 IN THE GROUND
126 Loony Jet Set
127 Eggoids
128 Beam me up Spotty
129 The Hole with
No Name
130 Secret passage
131 Without a Limb
132 Well
133 Dinking Vater
134 Oh $#!+
The Central Cavern

JET SET WILLY CHEAT MODE

Type in either listing and save it on tape. Reset the computer and then reload the program. Then insert your fully rewound Jet Set Willy tape and RUN the program in memory. Listing 1 load JSW as normal but without setting the pen colours. Listing 2 will not display anything on the screen other than a multicoloured line and the word searching. It will then give the normal loading messages, start the game and ask you to enter the colour code in the normal way.

Listing 1

```
10 LET obj=175:LET room=32
20 MEMORY 32000:LOAD"":MODE 1
30 FOR n=100 TO 186:READ a$
40 POKE n,VAL("&"+a$):NEXT n
50 POKE 151,obj:POKE 156,room-1
60 CALL 100
100 DATA 3e,c9,32,80,81,cd,41,81
110 DATA 21,14,80,11,d2,ae,01,12
120 DATA 01,ed,b0,21,14,80,11,b7
130 DATA 00,01,2c,00,ed,b0,21,c0
140 DATA 00,22,e3,00,3e,c3,32,e5
150 DATA 00,21,96,00,22,e6,00,c3
160 DATA b7,00,3e,af,32,21,97,3e
170 DATA 1f,32,5e,82,11,a5,82,21
180 DATA ae,00,01,09,00,ed,b0,c3
190 DATA 4a,ac,3e,42,cd,1e,bb,c2
200 DATA db,80,3e,a4,43,26,5a
```

Listing 2

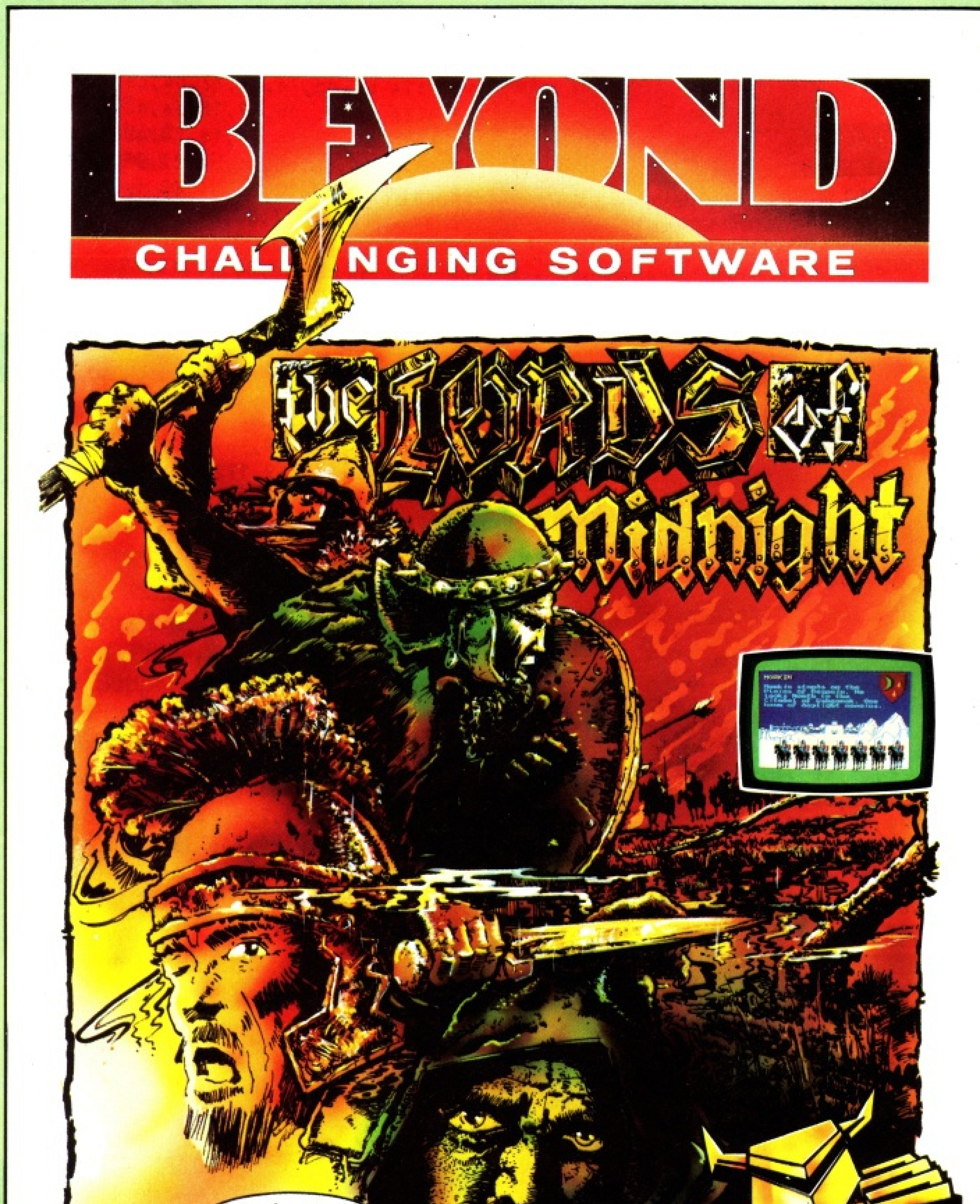
```
10 MEMORY 32000:LOAD"":MODE 1
20 FOR n=49152 TO 49287:READ a$
30 POKE n,VAL("&"+a$):NEXT n
40 addr=49288
50 READ a:READ b:READ c
60 IF b=0 THEN CALL 49152
70 POKE addr,a:POKE addr+1,b
80 POKE addr+2,c:addr=addr+3
90 GOTO 50
100 DATA 21,14,80,e5,11,d2,ae
110 DATA 01,12,01,ed,b0,e1,11
120 DATA 64,00,0e,2c,ed,b0,21
130 DATA 6d,00,22,90,00,3e,c3
140 DATA 32,92,00,21,28,c0,22
150 DATA 93,00,c3,64,00,dd,21
160 DATA 88,c0,21,5a,c0,11,62
170 DATA 80,ed,53,f4,86,01,2e
180 DATA 00,ed,b0,3e,c3,32,f3
190 DATA 86,21,f8,07,22,4e,81
200 DATA 0e,03,dd,6e,00,dd,66
```

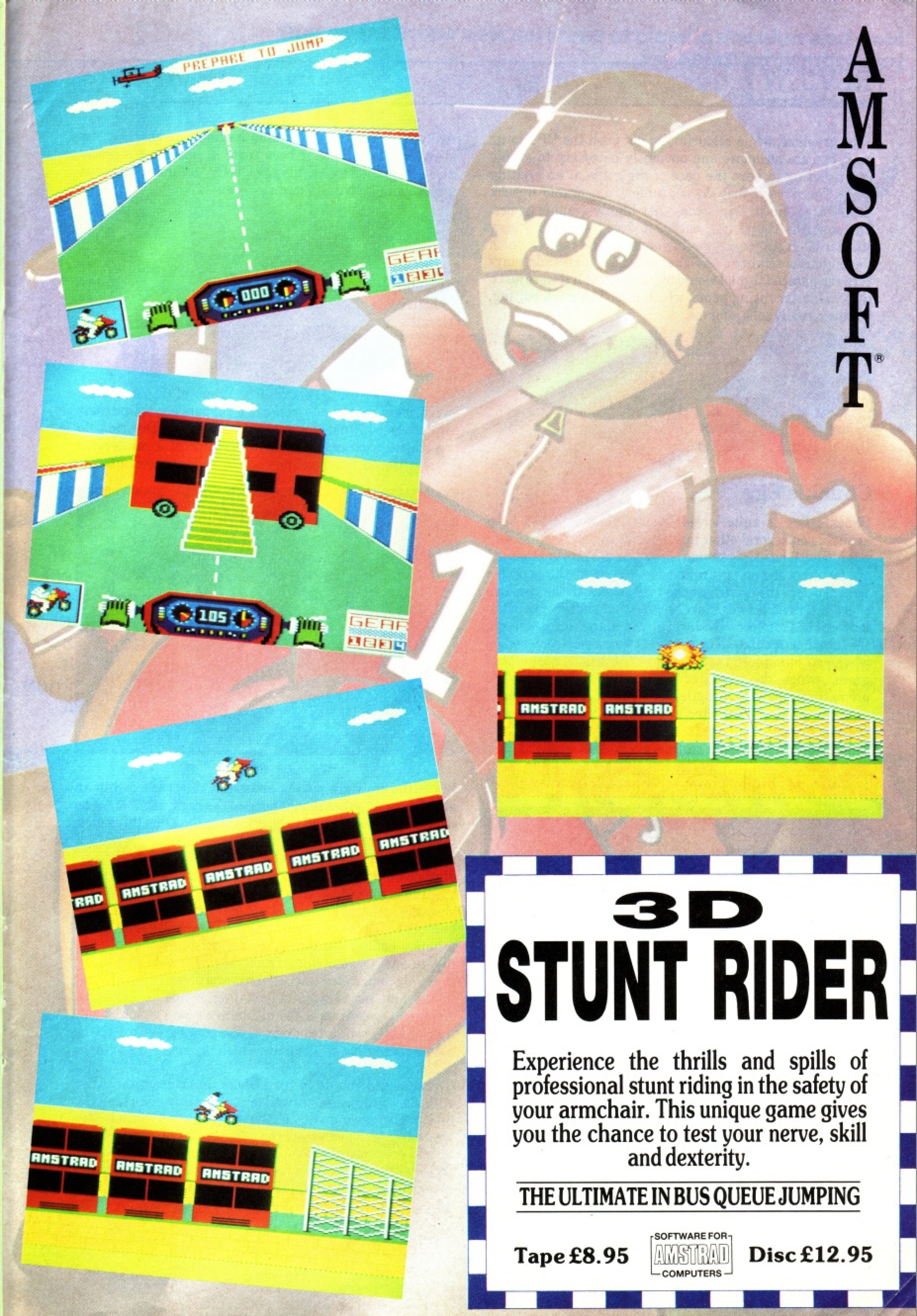
```
210 DATA 01,dd,7e,02,77,b4,ca
220 DATA 4A,ac,dd,09,18,ee,d2
230 DATA 44,83,f6,20,fe,74,c2
240 DATA f6,86,cd,b6,bc,21,03
250 DATA 00,cd,18,bb,d6,30,fe
260 DATA 0a,30,f7,06,0a,84,10
270 DATA fd,67,2d,20,ee,3d,fe
280 DATA 86,d2,ed,86,32,f8,79
290 DATA c3,8b,87
300 '
```

```
310 REM Infinite Lives and Exit Death
320 DATA 165,130,62,166,130,66,167,130,2
    05,168,130,30,169,130,187,170,130,19
    4,171,130,219,172,130,128,173,130,62
330 REM Start Room
340 DATA 94,130,31
350 REM Objects to collect
360 DATA 33,151,175
370 REM Number of lives
380 DATA 240,129,7
390 REM Drop any height
400 DATA 130,132,0
410 REM Death Object immunity
420 DATA 6,133,0,21,133,0,93,133,0,251,1
    31,0
430 REM walk on water
440 DATA 242,131,254,243,131,3,244,131,2
    20,245,131,196,246,131,144,247,131,6
    2,248,131,4,249,131,40,250,131,6
450 REM Immunity to Monsters
460 DATA 125,142,0
470 REM Turn off Monsters
480 DATA 143,141,201
490 REM Play Final Room
500 DATA 0,154,201
510 REM Trip Switch on
520 DATA 170,154,0
530 REM End data marker
540 DATA 0,0,0
```



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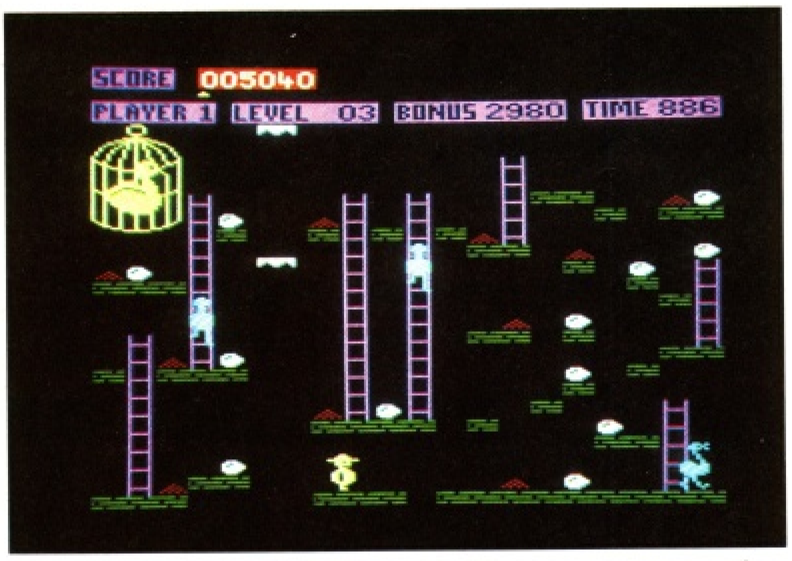
The graphics, while colourful, do not push the CPC to its limit but are adequate and obviously necessary to enable fast updating to keep the pace of the game at an exciting level. Thankfully, they do not suffer from frame flyback flicker as is the case in some other highly graphic games. The sound is there, but, again, it does not set any new standards - it just serves to let you know the rate at which the engine is ticking over. The obligatory naff tune plays between games.I think I would buy this game if it were just a reasonable car racing game, which it is. The track editing, however, really sells it for me.

Author	Amsoft
Format	Disc/Cassette
Price	£12.95/£8.95
Graphics	****
Playability	*****
Addictiveness	****
Overall	*****

Chuckie Egg

Chuckie Egg is quite a well known game and has been available on several other machines. It consists of that well tried game format: platforms and ladders. You play the part of a farmer who must get round and pick up all the eggs on a screen, before the ostrichesque birds can eat all the red piles of grain. Travel between levels is accomplished by use of the ladders that connect each level, or, on higher level screens, the lifts that circulate. The eggs are automatically picked up when you bump into them - this is also true of the piles of grain, which do score points, but may end your life prematurely once the last pile has been eaten or picked up.

Control of your character is a little difficult; it is only possible to go up a ladder if you are directly lined up with it. This invariably means a certain amount of shuffling back and forth before one can go up. With one of the birds approaching, this can prove rather hazardous. It is difficult



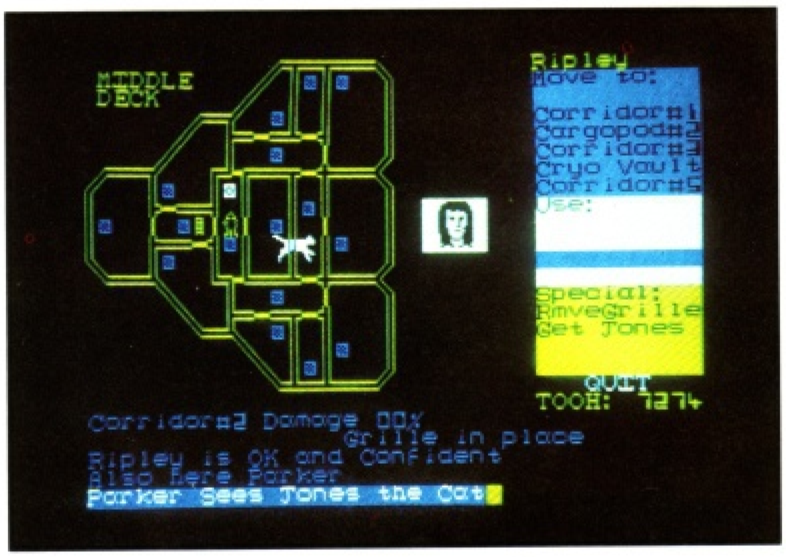
to say how many screens there are, I never got past number three because I found it very difficult to jump onto the lifts at just the right point. There cannot, however, be that many because the game is only 9K long which does not leave a great amount of room for screen data.

It is a pity that all the screens are the same colour, surely the few extra bytes of colour information would have been worthwile. The sound is also a disappointment, the game hardly stretches the machine to its limits so surely a few micro seconds could have been spent in setting up a pretty little background tune. This game is OK as far as it goes but cannot claim to give extraordinary value for money.

Author	A & F Software
Price	£7.90
Format	Cassette
Graphics	**
Playability	***
Addictiveness	**
Overall	**

Alien (Noshed in Space!)

You are the commander of a crew of inter-galactic lorrydrivers, who awake from a deep hypersleep to find their ship diverted from its homeward course. Diverted to investigate a strange planet, the source of a mysterious distress beacon, the crew find a crashed alien spacecraft.



While the crew are poking around in the crashed ship an alien thing attaches itself to one of the crew members. The crew member is brought onboard where the alien thing dies. If you have not seen the film, I will not spoil it for you, but it is enough to say that a new capital Alien hatches out and disappears into the darkest recesses of the ship. The rest of the film is concerned with hunting for the Alien in the vast ship, the eating of ninety percent of the crew, destroying the android which the company sent and finishing the film with a happy ending so that we do not all go home and have nightmares. Oh, didn't I mention the android? Well it seems that the company that own the ship and diverted it off course in the first place, want to get their hands on an Alien. Apparently an Alien is the ultimate weapon which is why they secretly sent an android as one of the crew, tostop the others strangling it at birth. Which brings me back to the game.

What would you do in their shoes, hunt down the Alien with flame throwers? Abandon and destroy the ship? Get eaten? The game gives you the opportunity to decide. You may move each member of the crew around the ship picking up and using objects as you find them. On the screen, one of three levels of the ship is displayed together with a menu of options that can be selected with a cursor. The game operates in real time so that while you are messing about

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looking for the stupid cat, the Alien could be messing about with your life support. Although there are not a large number of locations in the ship, there are maze-like ducts that connect each room making it impossible to be sure where the Alien is. If the character that you are controlling meets the Alien, the screen clears to show you a picture of the evil beast and suitable sound effects are produced to indicate you are being chomped.

The uncertainty of the Aliens whereabouts is very important to the atmosphere of the film and the game follows the story fairly closely in this. However, there is an element of the adventure game, where objects have to be found and used to solve specific problems, that detracts from the strategic interest of the game. The movement of players is also rather cumbersome. Altogether Alien is an interesting, well balanced game, which deserves persevering beyond the unfriendly user interface.

'Tell me Alien. Why do you eat people?' 'In space, nobody sells ice-cream.' Joseph Conrad

Author	Argus Press
Format	Cassette
Price	£8.99
Graphics	**
Playability	**
Addictiveness	***
Overall	***



The Tripods

As its name rightly suggests, this is an adventure game based on the popular BBC television series. The aim is to avoid being seen by the Tripods whilst in search of the White Mountains in the South East of France. My first impressions of it were that it takes an awfully long time to load: about 15 minutes in all. For those of you lucky enough to have the right cassette alignment, Side B of the cassette is 'Speed Load'.

Having loaded the game successfully, I was pleased to find that up to four people can choose to play; which makes a nice change from those lonely adventures that we all get hooked on from time to time.Recruits found, we were off on our travels. Each player started the game in good health, well fed, high Tripod immunity, some move credits, some groceries and some money. There are a choice of sixports from which to commence the journey. We all chose the same port(the one that looked nearest to the White Mountains on the enclosedmap) since we had hoped to learn from eachother's experiences.

On the journey you have to cope with the terrain, the weather and theTripods. It is impossible to avoid any contact with the Tripods but the best course of action is to collect objects which will help if contact is imminent. If you are noticed by a Tripod your immunity to being 'capped' is decreased till eventually you are capped and the game is lost.

The keyboard controls are easy. Most of them are situated on the number pad, which meant that we did not have to keep referring to theinstruction booklet which so often happens with adventure games. The game could certainly be played by children with perhaps a little help with the onscreen prompts. Nevertheless all the actions were simple to follow and no actual typing of words was required. When an action is prompted a multiple choice of options appears on the screen from which it is possible to choose an option with just a single keystroke.

Unfortunately, the screen is rewritten each time an action is taken making the game a little slow, but the graphics and perspective are good. We particularly liked the approaching Tripods as they loomed larger and larger on the horizon.

Each player takes his turn after the end of a day's travelling and at the end of seven days a weekend rest is taken. At this point it ispossible to save the game for another evening which is essential if the task is to be successfully achieved. Unfortunately, neither of us quite made it to the White Mountains so I am unable to comment on the arrival that awaits you there.

If you like adventure games and have a couple of willing children to play with then this game is well worth looking out for.

Author	Watermill Productions Ltd
Price	£10.95
Format	Cassette
Graphics	***
Playability	****
Addictiveness	***
Overall	***



MORE NEXT MONTH!

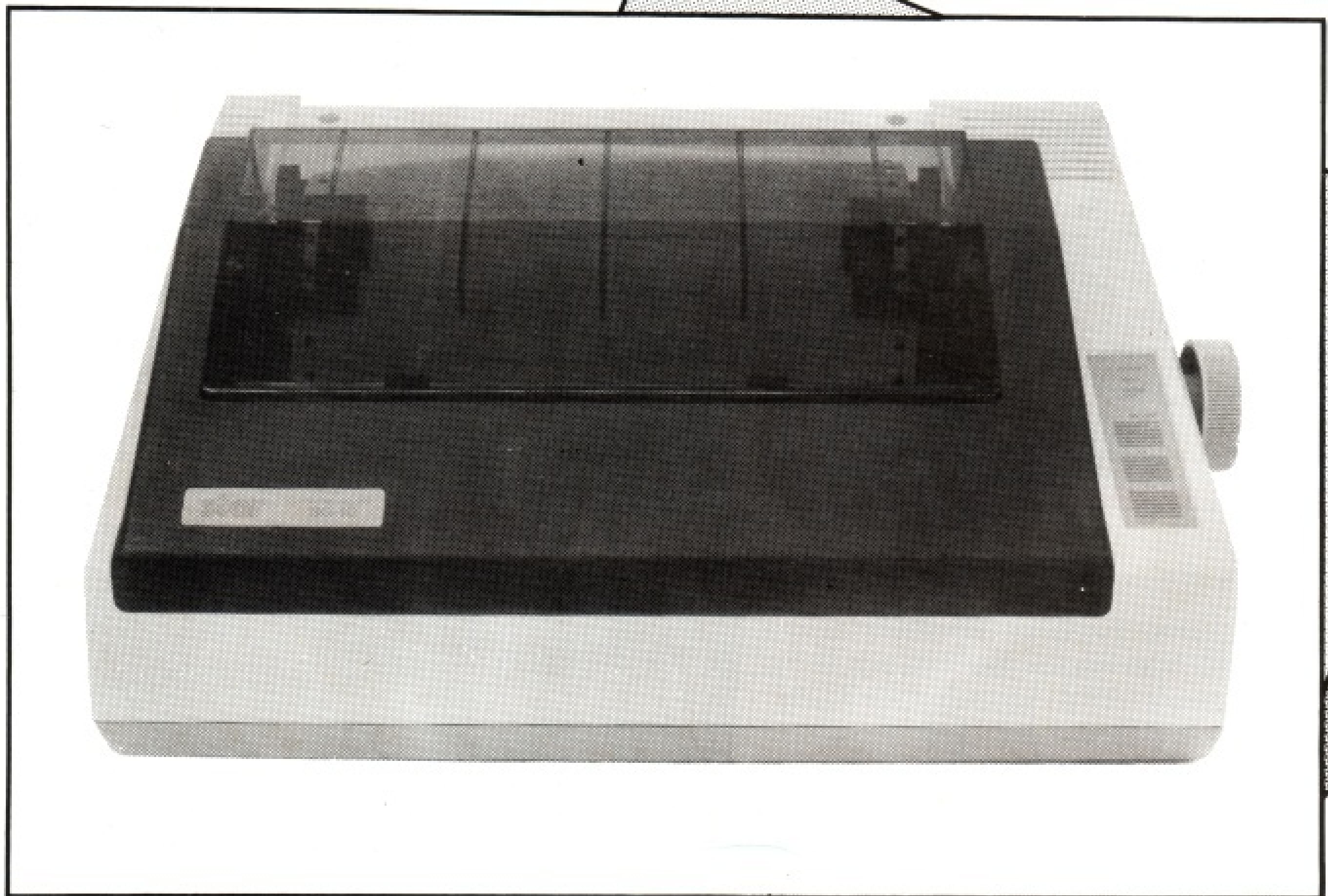
ACU

Star SG-10 Printer

by Steve Godwin.

Many Amstrad owners find that they would like a printer to attach to their micro, for programming, word processing or a host of other reasons. There are many printers on the market, and the model that each user chooses, differs, depending on what the printer is to be used for, and the amount of money that he wants to spend.

If a programmer wants a printer for listings, then he will be looking for speed and not quality and will probably go for a dot matrix printer. However, if the printer is to be used mainly for word processing, then quality is more important than speed, and he may well plump for a daisy wheel printer that has a typewriter type output. Finally, graphics may be the reason why the printer is wanted. A good choice in this case could be a plotter.



The SG-10 and SG-15 are two new printers from Star. They are both dot matrix printers, but also have Near Letter Quality and graphics modes that may interest people who may have bought the daisy wheel printer or plotter. The SG-10 can take ten inch paper and prints 80 columns in normal print mode, whereas the SG-15 can take fifteen inch paper and print 132 columns of text. For the average user, the SG-10 would be adequate. The extra capacity of the SG-15 is mainly of use for graphics work or for printing out results from a spreadsheet.

The pitch for normal characters is 10 characters per inch as is the norm. At this pitch, the SG-10 can print at 120 characters per second which is a respectable speed. The head prints bi-directionally which means that it prints while moving in both directions and therefore does not have to return to the left of the printer every time a new line is printed. The standard characters printed by the SG-10 are nicely formed and very reasonable, but many enhancements also exist. Characters can also be printed, emphasised and with double strike. The first of these prints the character twice, slightly offset to fill in the gaps between the dots and the second prints each line twice to make a stronger impression the paper. The quality of the print produced using this process is very good but is quite chunky and still looks like it was printed on a dot matrix printer.

However, these printers have a Near Letter Quality mode. This mode produces text using a nice character set and double strike techniques, to produce a very pleasing font that is very easy to read and, unless studied closely, could pass for output from a daisy wheel printer. The price you pay for using this mode is speed, but having said that, it is faster than NLQ on many other printers.

Apart from these print options, you may also use condensed and expanded print, superscripts and subscripts, and to give documents a professional look, proportional spacing. This means that every character printed is given only the amount of space that it needs and not a standard width as would appear on a computer screen.

The SG-10 has a multitude of character sets, which include normal ASCII characters (an industry standard), international characters, NLQ characters, IBM characters and an italic set. As well as this, you can define your own characters which are stored in the printer's own memory. You can define any character and you may also define its size so that, if you want, you can print your own characters in proportional print mode. This means that, for example, a very nice script character set could be defined and used for letters, or you

could draw simple diagrams with symbols chosen by you, and not just the ones built in to the printer.

On the subject of diagrams, the SG-10 also has a graphics mode. This enables you to 'draw' with the printer. The print head of a dot matrix printer is made up of a row of 9 vertical dots. These can be moved individually and characters are printed by moving the relevant pins, hitting the ribbon, moving the head, moving the relevant pins, hitting the ribbon and so on, to build up the character. In bit image mode, you have complete control over which pins are in and which are out, enabling you to draw any shape or picture. There are 7 graphics modes, all with different levels of speed and density. The higher the density of the graphics the slower the printer becomes and the more points you have to define. This can be compared with drawing a picture in mode 0 and then drawing the same picture in mode 2. The second picture will look better and have more detail, but will be much harder to draw and therefore take up more memory and take longer.

Because of the way printers are made, you cannot plot a point where and when you like as you can on the screen, but you have to work out exactly what you want to draw and where in the computer, and then send the data to the printer in the order it is to be printed. Another thing that you can do to use the graphics on the SG-10 are screen dumps. These are basically exact copies of what you see on the screen, printed out on the printer. One major problem with screen dumps on the Amstrad is that, its output is in colour and the SG-10, as most dot-matrix printers, is black and white. This problem can be solved by using a grey scale. This means that black is printed as a complete block, blue as a block with some holes, and so on until yellow, which is printed as a few dots, and white, where nothing is printed at all. This is the same technique as is used to print black and white photos in newpapers, but the dots are far smaller. The example shown uses this principle and was produced using The Amstrad Connexion, written by Connexions.

Other features of the printer include a 2K buffer (16K in SG-15) which means that the printer can take in data faster that it can actually print it, and store it, ready to print. This means that the computer will be free to carry on with what it was doing before, while the printer gets on with the printing. Another feature that is useful is that the printer is Epson compatible. Epson printers became an industry standard a few years back and most software that uses special functions and control characters, use the Epson codes. The SG-10 recognises these codes and therefore will work with most software that uses a printer.

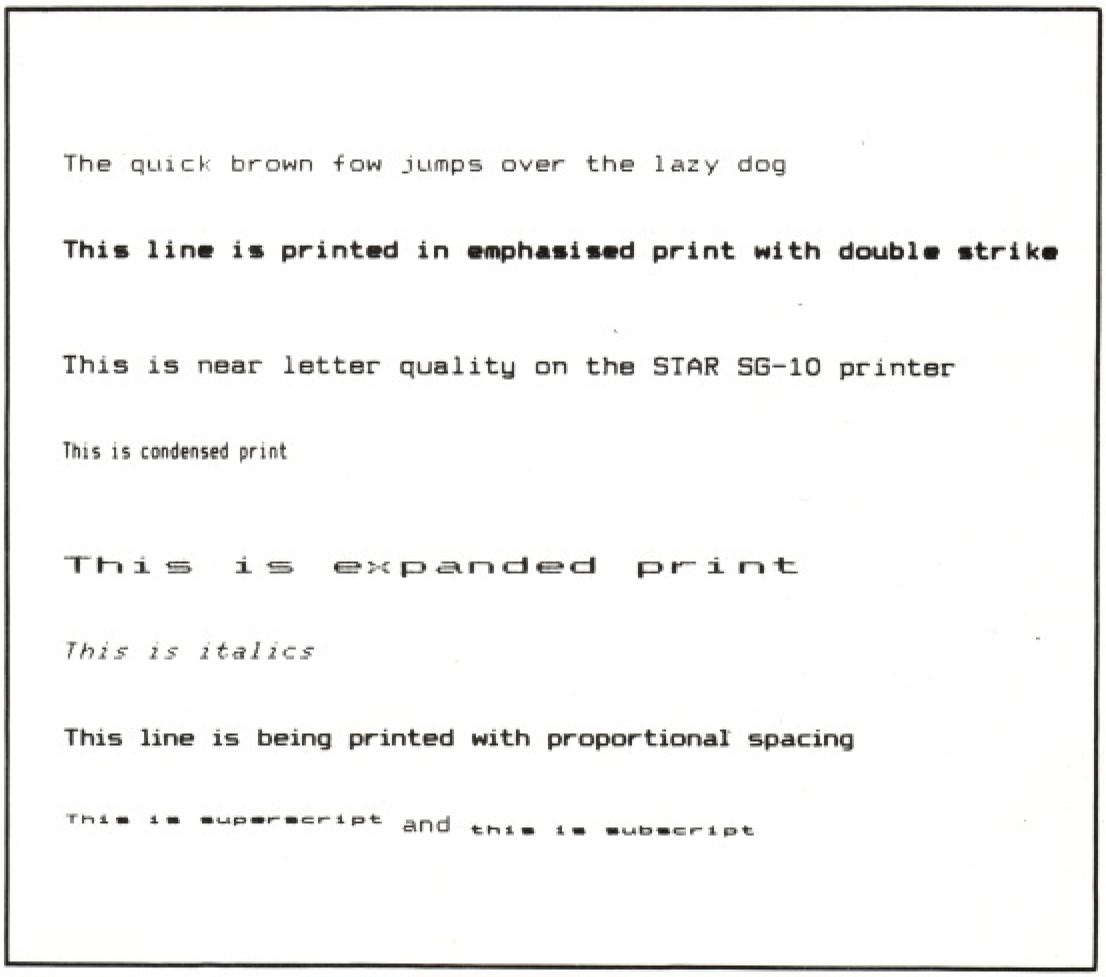
DIP Switches... these words are normally met with screams of horror. Many printer manufacturers hide them away in the darkest recesses of the printer, the owner needing a torch and tweezers to access them, or at least the removal of a cover. But here, Star score again, the DIP (Dual In-line Package) switches are easily accessible through a hole in the side of the printer. These miniature switches can be used to set certain features when the printer is powered up. These features include which character set is used, font type (normal or NLQ), character size, ignore paper out sensor, paper length setting and others. These are only the default settings and can all be altered under software control by sending the relevant sequences to the printer from the computer.

The noise level of this printer is by no means low, but is acceptable. However, line feeding is very smooth and very quiet. There is a choice of either friction or tractor feed. The first of these drags the paper through like a typewriter and the second pulls the paper through using sprocket holes in the side of the paper. On the SG-10, when using tractor feed, it is very hard to wind the paper backwards through the printer and friction feed has to be employed to assist. On the running cost side, the SG-10 uses a ribbon to print from as opposed to the cartridge that most manufacturers go for. Replacing the ribbons can be a bit messy and sometimes a bit of a pain, but ribbons are much cheaper than cartridges.

To sum up, the STAR SG-10 is very good value for money at £197.95 and should serve most of your printer needs. It is available from Datastar Systems UK.

ACU





The quick brown fow jumps over the lazy dog

This line is printed in emphasised print with double strike

This is near letter quality on the STAR SG-10 printer

This is condensed print

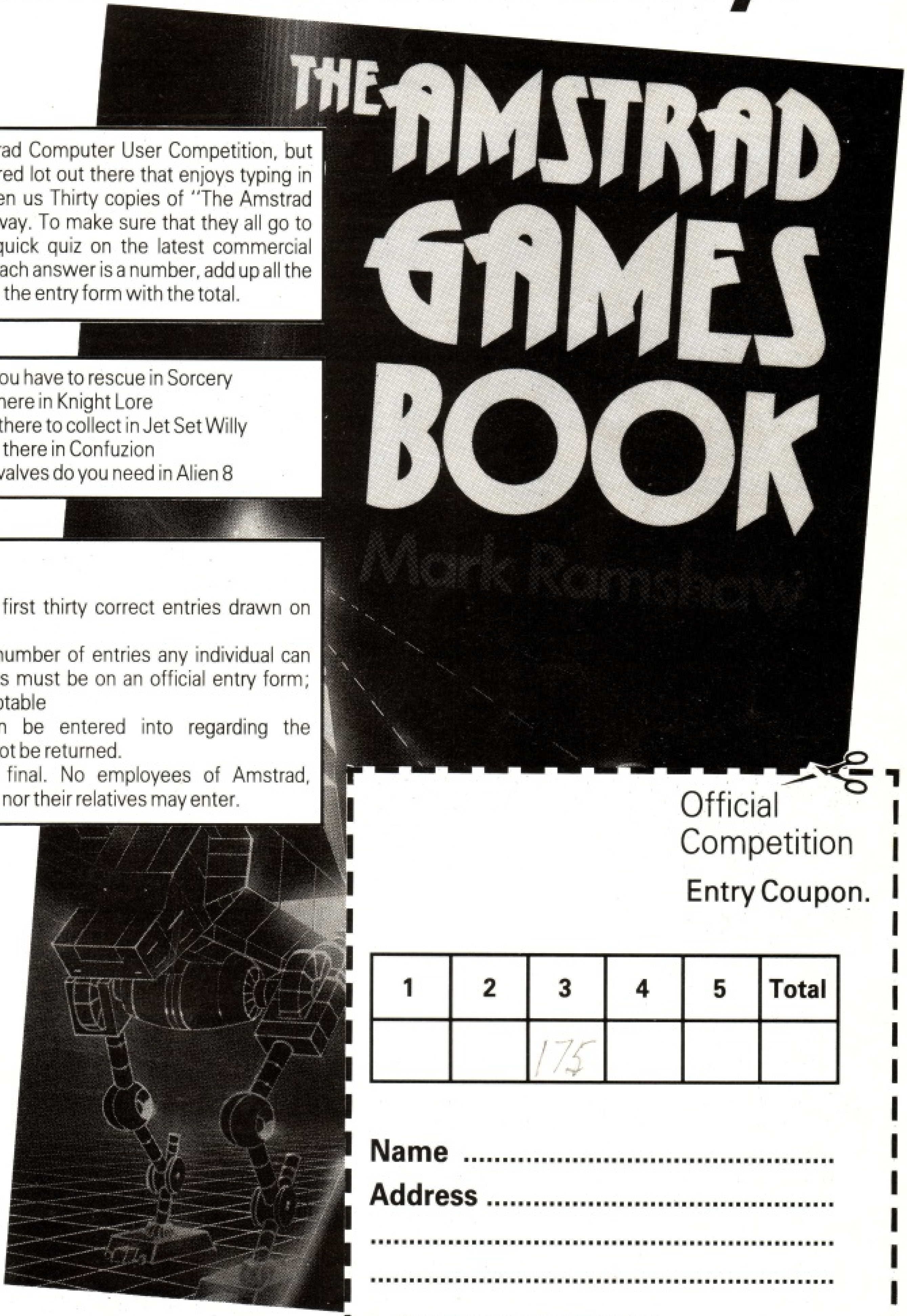
This is expanded print

This is italics

This line is being printed with proportional spacing

This is superscript and this is subscript

Games Freaks Only!



Yet another super Amstrad Computer User Competition, but only for the nimble fingered lot out there that enjoys typing in games. Pitman have given us Thirty copies of "The Amstrad Games Book" To give away. To make sure that they all go to good homes here is a quick quiz on the latest commercial games for the Amstrad. Each answer is a number, add up all the numbers and put them on the entry form with the total.

1 How many friends do you have to rescue in Sorcery
2 How many rooms are there in Knight Lore
3 How many objects are there to collect in Jet Set Willy
4 How many screens are there in Confuzion
5 How many Thermolec valves do you need in Alien 8

Rules

The winners will be the first thirty correct entries drawn on September 27th 1985.
There is no limit to the number of entries any individual can make, however all entries must be on an official entry form; photocopies are not acceptable
No correspondence can be entered into regarding the competition. Entries cannot be returned.
The judges decision is final. No employees of Amstrad, Amsoft, or Amstrad User, nor their relatives may enter.

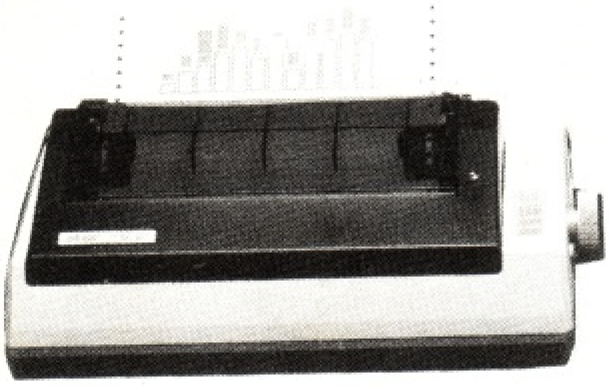
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Competition
Entry Coupon.

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		175			

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Address ....
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3 Entries should be sent to:
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Character Sets

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88 Standard International Characters
96 Italic Characters
88 Italic International Characters
96 NLQ Characters
88 NLQ International Characters

Character Matrix

Standard Characters: 9 dot × 11 dot
STAR Block Graphics: 6 dot × 6 dot
IBM Block Graphics: 12 dot × 11 dot
User Defined: 8 dot × 4 to 11 dot
Near Letter Quality: 17 dot × 11 dot

Character Fonts

Normal (10 CPI)
Elite (12 CPI)
Condensed (17 CPI)
NLQ (10 CPI)

Line Spacing 1/6, 1/8 in. or 7/72 in. Standard

Dimensions (W × D × H)
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80, 96, 136, (40, 48, 68 Double Width)

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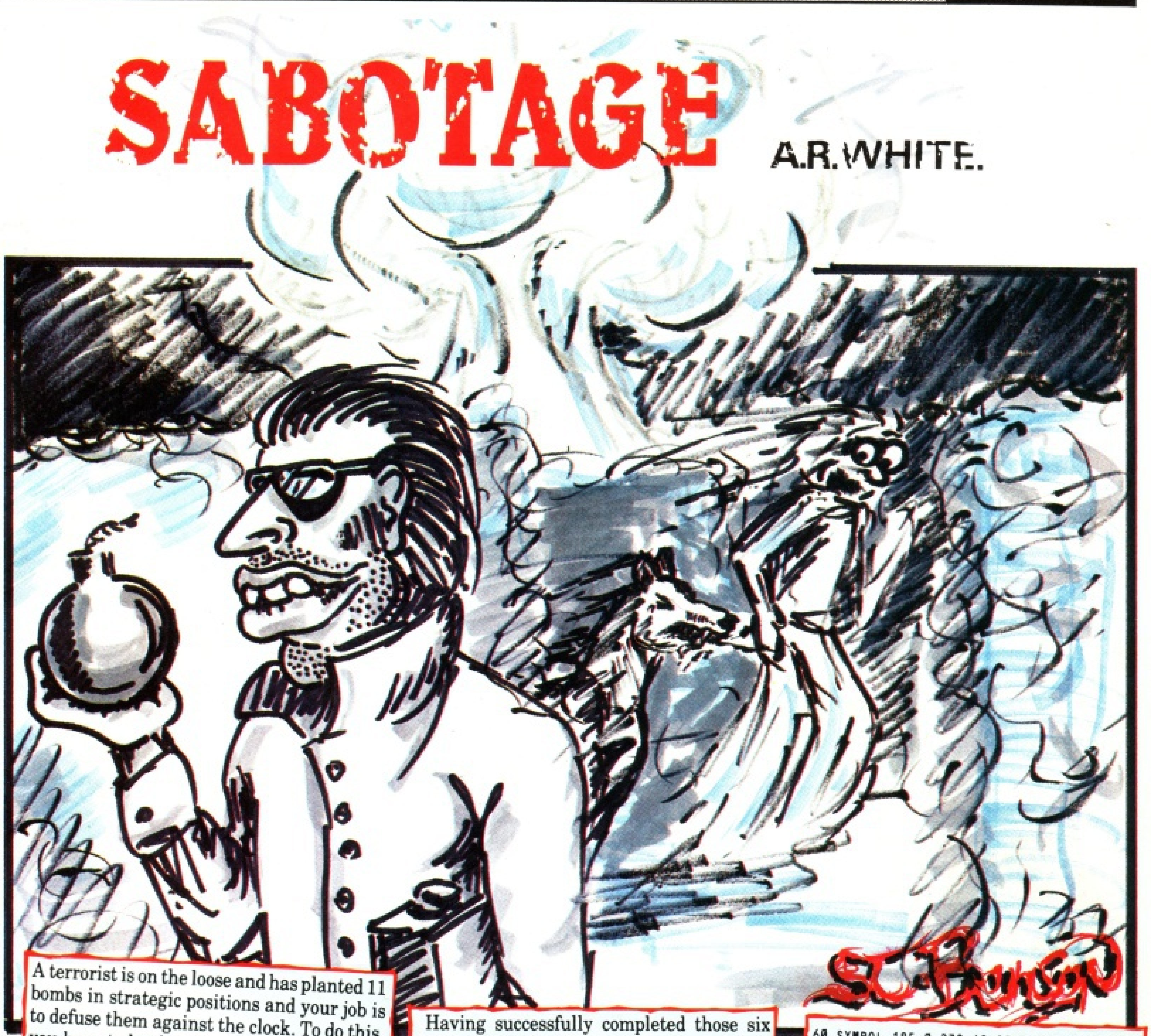
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The terrorist is just standing there waiting to be caught; but beware, because he has a remote controlled detonating device on him and if you capture him before defusing all the bombs, he blows you up and you lose a life.

You gain points which increase as the game progresses, for defusing each of the bombs. As an added bonus, for every 5000 points, you gain a life.

The game gets progressively more difficult. After the first four mazes have been successfully completed, the next four have the added distraction of a time bomb, which, if not defused within it's time limit, will result in the loss of a life. A third dog appears on the next four mazes to make life difficult; and then the next four mazes have you up against three dogs and the time bomb.

Having successfully completed those six mazes, there is now less time to complete the following eight mazes, which are the same as the previous eight, with three dogs.

The art of the game is to trap the dogs, not just to run away (which could get you into terrible trouble), therefore rendering him harmless for a while. You must keep your eyes open the time though.

Movement is by either joystick, cursor keys or Z and X for left and right and] and \ for up and down.

```
10 DEFINT a-z:DEFREAL s,h
20 SYMBOL AFTER 185
30 DIM scrn$(20,25):game=0:dogs=2:scr=0:points=1:lives=3:die=0:char=184:scrn=1:tpos=0:dec=0:stme=1001:xtra=0:scrndata=1:hscr=0:dog=254:md=0:tbp=0:restart=0:tbt=0:del=0
40 INK 1,26:INK 2,10:INK 3,3:INK 4,15,16:INK 5,2:INK 6,0:INK 7,4:INK 8,3,6:BORDER 0:PAPER 1:CLS
50 SYMBOL 255,96,224,33,62,62,34,33,33:SYMBOL 254,6,7,132,124,124,68,132,132
60 SYMBOL 185,0,238,42,234,138,238,0,0:SYMBOL 186,0,78,74,78,66,66,0,0:SYMBOL 187,0,78,74,78,74,78,0,0:SYMBOL 188,0,78,66,66,66,66,0,0:SYMBOL 189,0,72,72,78,74,78,0,0:SYMBOL 190,0,78,72,78,66,78,0,0:SYMBOL 191,0,72,72,72,74,79,2,0
70 SYMBOL 192,0,78,66,78,66,78,0,0:SYMBOL 193,0,78,66,78,72,78,0,0:SYMBOL 194,0,36,36,36,36,36,0,0:SYMBOL 195,0,78,74,74,74,78,0,0:SYMBOL 196,0,56,40,56,8,8,0,0:SYMBOL 197,0,56,40,56,40,56,0,0:SYMBOL 198,0,56,8,8,8,8,0,0:SYMBOL 199,0,32,32,56,40,56,0,0
80 SYMBOL 200,0,56,32,56,8,56,0,0:SYMBOL 201,0,32,32,32,40,60,8,0:SYMBOL 202,0,56,8,56,8,56,0,0:SYMBOL 203,0,56,8,56,32,56,0,0:SYMBOL 204,0,16,16,16,16,16,0,0:SYMBOL 205,0,56,40,40,40,56,0,0:SYMBOL 253,56,56,146,124,16,40,40,40
90 GOSUB 770:RESTORE:MODE 0
100 IF game=1 THEN DIM scrn$(20,25):MODE 0:game=0:dogs=2:scr=0:points=1:lives=3:die=0:char=184:scrn=1:tpos=0:dec=0:stme=1001:xtra=0:scrndata=1:dog=254:md=0:tbp=0:restart=0:tbt=0:del=0
110 DI:IF scrn=9 AND dec=1 THEN stme=stme-100:IF stme<200 THEN stme=201
```

```
120 IF scrn=9 THEN dogs=3:scrn=1:dec=1:p
    oints=points+1:IF points>10 THEN poi
    nts=10
130 IF scrn=5 THEN points=points+1:IF po
    ints>10 THEN points=10
140 tme=stme:IF scrn=8 AND stme=201 THEN
     stme=1001:dogs=2:points=1:die=0:cha
    r=184:scrn=1:tpos=0:dec=0:xtra=0:scr
    ndata=1:tme=stme:md=0:tbp=0
150 bomb=0
160 CLS:FOR x=1 TO 20
170 READ y
180 LOCATE x,y:PEN 2:PRINT CHR$(207)
190 scrn$(x,y)= CHR$(207)
200 IF y=24 THEN NEXT ELSE GOTO 170
210 FOR a=1 TO 11
220 READ x,y
230 LOCATE x,y:PEN 3:PRINT CHR$(252)
240 scrn$(x,y)= CHR$(252)
250 NEXT
260 READ x,y
270 LOCATE x,y:PEN 4:PRINT CHR$(253)
280 scrn$(x,y)= CHR$(253)
290 READ x,y
300 LOCATE x,y:PEN 5:PRINT CHR$(224):yy=
    y:yx=x
310 scrn$(x,y)= CHR$(224)
320 FOR a=1 TO dogs
330 READ x,y
340 LOCATE x,y:PEN 6:PRINT CHR$(255):dy(
    a)=y:dx(a)=x
350 scrn$(x,y)= CHR$(255):NEXT
360 IF dogs=2 THEN READ x,y:x=0:y=0
370 LOCATE 1,1:PEN 7:PRINT"SCORE       H
    ISCORE":LOCATE 1,25:PRINT"TIME
     LIVES":LOCATE 17,25:PRINT lives
380 EI
```

```
390 DI:LOCATE 1,2:PEN 7:PRINT scr:LOCATE
     14,2:PRINT hscr:EI
400       REM *** main program loop ***
410 FOR md=1 TO dogs
420       REM *** move you & check if hit
     ***
430  oyy=yy:oyx=yx:IF INKEY (0)<>-1 OR I
    NKEY (19)<>-1 OR JOY (0)=1 THEN yy=y
    y-1:GOTO 470
440 IF INKEY (2)<>-1 OR INKEY (22)<>-1 O
    R JOY (0)=2 THEN yy=yy+1:GOTO 470
450 IF INKEY (1)<>-1 OR INKEY (63)<>-1 O
    R JOY (0)=8 THEN yx=yx+1:GOTO 470
460  IF INKEY (8)<>-1 OR INKEY (71)<>-1
    OR JOY (0)=4 THEN yx=yx-1
470  IF scrn$(yx,yy)= CHR$(207) THEN yx=
    oyx:yy=oyy:GOTO 500
480  IF oyy+oyx=yy+yx THEN 550
490  DI:LOCATE oyx,oyy:PRINT" ":scrn$(oy
    x,oyy)=""
500  EI:IF scrn$(yx,yy)= CHR$(252) THEN
    GOSUB 1240
510  IF scrn$(yx,yy)= CHR$(255) OR scrn$
    (yx,yy)= CHR$(254) THEN GOSUB 1300:G
    OTO 710
520  IF scrn$(yx,yy)= CHR$(253) THEN GOS
    UB 1330
530  DI:IF scrn$(yx,yy)>CHR$(184) AND sc
    rn$(yx,yy)<CHR$(206) THEN GOSUB 1760
540  DI:PEN 5:LOCATE yx,yy:PRINT CHR$(22
    4):scrn$(yx,yy)=CHR$(224):EI
550 IF die=1 THEN GOTO 710
560 IF scr>xtra+5000 THEN lives=lives+1:
    xtra=xtra+5000:IF lives>10 THEN live
    s=10
570 IF dead=1 THEN GOTO 720
580 IF scr>hscr THEN hscr=scr:DI:LOCATE
    14,2:PEN 7:PRINT hscr:EI
590       REM *** move dogs check if hit
     ***
```

```
600 odx(md)=dx(md):ody(md)=dy(md)
610  IF dx(md)<yx AND (scrn$(dx(md)+1,dy
    (md))<CHR$(35) OR scrn$(dx(md)+1,dy(
    md))=CHR$(224)) THEN dx(md)=dx(md)+1
    :dog=254
620  IF dx(md)>yx AND (scrn$(dx(md)-1,dy
    (md))<CHR$(35) OR scrn$(dx(md)-1,dy(
    md))=CHR$(224)) THEN dx(md)=dx(md)-1
    :dog=255
630  IF dy(md)>yy AND (scrn$(dx(md),dy(m
    d)-1)<CHR$(35) OR scrn$(dx(md),dy(md
    )-1)=CHR$(224)) THEN dy(md)=dy(md)-1
```

```
640  IF dy(md)<yy AND (scrn$(dx(md),dy(m
    d)+1)<CHR$(35) OR scrn$(dx(md),dy(md
    )+1)=CHR$(224)) THEN dy(md)=dy(md)+1
650  IF odx(md)=dx(md) AND ody(md)=dy(md
    ) THEN 690
660  IF scrn$(dx(md),dy(md))=CHR$(224) T
    HEN GOSUB 1300
670  DI:PEN 6:LOCATE odx(md),ody(md):PRI
    NT CHR$(32):LOCATE dx(md),dy(md):PRI
    NT CHR$(dog):scrn$(odx(md),ody(md))=
    CHR$(32):scrn$(dx(md),dy(md))=CHR$(d
    og):EI
680 SOUND 1,143,7
690 NEXT md
700 IF scrn>4 AND tbp=0 THEN GOSUB 2000
710 IF die=1 THEN GOSUB 1740
720 IF dead=1 OR lives=0 THEN GOSUB 1790
    :GOTO 100
730 DI:LOCATE 17,25:PEN 7:PRINT lives:EI
    :IF lives=0 THEN dead=1:GOTO 720
740 IF restart=1 OR die=1 THEN ON scrnda
    ta GOSUB 1570,1610,1650,1690:restart
    =0:die=0:tbp=0:GOTO 110
750 tme=tme-1:DI:LOCATE 5,25:PEN 7:PRINT
     tme:EI:IF tme=0 THEN die=1:lives=li
    ves-1:GOTO 710
```

```
760 GOTO 400
770 MODE 1
780 PEN 3:PRINT:PRINT
790 CLS:PRINT" *** **** **** **** *** **
    ** * **** ***"
800 PRINT"  *  *    *  * *  * * * *  * *
     *     *"
810 PRINT"  *  ***  **** **** * * **** *
     ****  *"
820 PRINT"  *  *    * *  * *  * * * *  *
        *  *"
830 PRINT"  *  **** *  * *  * *** *  * *
     ****  *"
840 PRINT:PRINT:PRINT
850 PRINT"          *** *** *** *** *** *
     *"
860 PRINT"          * *  *   *  * * *   *
    *"
870 PRINT"          ***  *   *  *** *   **
    *"
880 PRINT"          * *  *   *  * * *   *
    *"
890 PRINT"          * *  *   *  * * *** *
     *"
900 PRINT:PRINT:PRINT"              BY A
     R WHITE":PRINT"              25\9\1
    984"
910 GOSUB 1130:PRINT:PRINT:PRINT"
       INSTRUCTIONS (Y\N)"
920 in$=INKEY$:IF in$="" THEN 920
930 IF in$="Y" OR in$="y" THEN 950
940 IF in$="N" OR in$="n" THEN RETURN
950 MODE 0:CLS:LOCATE 4,1:PEN 3:PRINT"IN
    STRUCTIONS"
```

```
960 PRINT:PRINT:PRINT"the idea of the ga
    meis to gain points bydefusing bombs
     and  then capturing the  TERRORIST"
970 a2$="HIT ANY KEY":GOSUB 1100
980 LOCATE 3,1:PRINT"THE TERRORIST":PRIN
    T:PRINT TAB(9) CHR$(253):PRINT:PRINT
    "he has planted 11   BOMBS and has a
         remote control whichwill set th
    e BOMBS  off if captured     before
    all BOMBS aredefused, including  a T
    IME BOMB which    is randomly set
990 PRINT"he also has let      loose init
    ially 2   DOGS, to hinder you"
1000 GOSUB 1100
```

```
1010 LOCATE 6,1:PRINT"THE DOGS":PRINT:PR
     INT TAB(9) CHR$(254):PRINT:PRINT"ar
     e out to get you. if bumped into a
         life is lost.":PRINT:PRINT TAB(2
     ) "A HELPFUL HINT":PRINT "is TO tra
     p the DOGS  rendering them harm-les
     s FOR a WHILE"
1020 GOSUB 1100
1030 LOCATE 4,1:PRINT"THE BOMBS":PRINT:P
     RINT TAB(9) CHR$(252):PRINT:PRINT"y
     our task is to     defuse them in t
     he  time given."
1040 GOSUB 1100
1050 LOCATE 3,1:PRINT"THE TIME BOMB":PRI
     NT:PRINT TAB(9) CHR$(185):PRINT:PRI
     NT"it decrements to     0 and must b
     e       defused before then or you
     lose a life. it randomly appears in
      every other set  of 4 mazes."
1060 GOSUB 1100
1070 LOCATE 8,1:PRINT"YOU":PRINT:PRINT T
     AB(9) CHR$(224):PRINT:PRINT"have 3
     lives, but   can increase them   ev
     ery 5000 points.":PRINT:PRINT TAB(6
     )"MOVEMENT":PRINT"is EITHER BY :-":
     PRINT"JOYSTICK":PRINT"CURSOR KEYS":
     PRINT"Z,X LEFT,RIGHT":PRINT"],\ UP,
     DOWN"
1080 a2$=a2$+" to play":GOSUB 1100
1090 RETURN
```

```
1100 LOCATE 2,24:PRINT a2$
1110 a1$=INKEY$:IF a1$="" THEN 1110
1120 CLS:RETURN
1130      REM *** play beginning tune ***
1140 RESTORE 2250
1150 READ note:IF note=-1 THEN WHILE SQ(
     1)<>4:WEND:RETURN
1160 SOUND 1,note,20,7
1170 GOTO 1150
1180      REM *** pick up terrorist tune
     ***
1190 RESTORE 2290
1200 READ note,ti:IF note=-1 AND ti=-1 T
     HEN WHILE SQ(1)<>4:WEND:RETURN
1210 IF ti=1 THEN SOUND 1,note,15,7
1220 IF ti=0 THEN SOUND 1,note,25,7
1230 GOTO 1200
1240      REM *** pick up bomb ***
1250 bomb=bomb+1:ENV 2,5,3,1,1,0,90,5,-3
     ,2:ENT 2,25,10,2,60,-10,1:SOUND 1,6
     0,100,0,2,2
1260 DI:scr=scr+(10*points):LOCATE 1,2:P
     EN 7:PRINT scr:EI
1270 IF scr>hscr THEN hscr=scr:DI:PEN 7:
     LOCATE 14,2:PRINT hscr:EI
1280 RETURN
1290      REM *** a dog got you ***
1300 die=1:lives=lives-1
1310 lost= REMAIN (3):tbp=0:char=184
```

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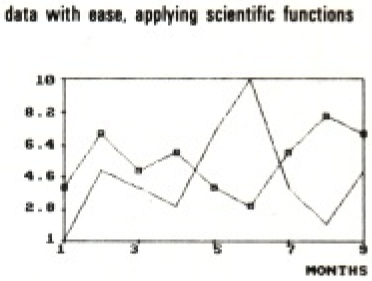
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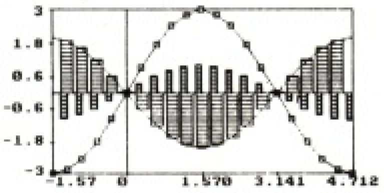
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```
1320 RETURN
1330     REM *** pick up terrorist ***
1340 lost= REMAIN (3):IF bomb<>11 OR tbp
     =2 THEN lives=lives-1:tbp=0:GOSUB 1
     920:restart=1:RETURN
1350 tbp=0
1360 GOSUB 1180
1370 scrn=scrn+1:scr=scr+(30*points):DI:
     LOCATE 1,2:PEN 7:PRINT scr:EI
1380 IF scr>hscr THEN hscr=scr:DI:PEN 7:
     LOCATE 14,2:PRINT hscr:EI
1390 scrndata=scrndata+1:IF scrndata=5 T
     HEN scrndata=1
1400 restart=1
1410 RETURN
1420     REM *** find possition for time
      bomb ***
1430 RANDOMIZE (TIME):tpos=INT (RND (5)*
     10):IF tpos<1 OR tpos>5 THEN 1430
1440 IF tpos=1 THEN tx=16:ty=4:GOTO 1490
1450 IF tpos=2 THEN tx=6:ty=9:GOTO 1490
1460 IF tpos=3 THEN tx=4:ty=14:GOTO 1490
1470 IF tpos=4 THEN tx=6:ty=22:GOTO 1490
1480 IF tpos=5 THEN tx=16:ty=23
1490 IF scrn$(tx,ty)=CHR$(224) OR scrn$(
     tx,ty)=CHR$(254) OR scrn$(tx,ty)=CH
     R$(255) THEN 1430
```

```
1500 EVERY 70,3 GOSUB 1520
1510 RETURN
1520     REM *** run countdown ***
1530 tbp=2:char=char+1:PEN 8:LOCATE tx,t
     y:PRINT CHR$(char):scrn$(tx,ty)=CHR
     $(char)
1540 SOUND 1,60,5,7
1550 IF char=205 THEN tpos=0:lost= REMAI
     N (3):lives=lives-1:restart=1:char=
     184:tbp=0:GOSUB 1920
1560 RETURN
1570     REM *** restores to first scree
     n ***
1580 ERASE scrn$:DIM scrn$(20,25)
1590 restart=1
1600 lost= REMAIN (3):RESTORE:RETURN
1610     REM *** restores to second scre
     en ***
1620 ERASE scrn$:DIM scrn$(20,25)
1630 restart=1
1640 lost= REMAIN (3):RESTORE 2130:RETUR
     N
```

```
1650     REM *** restores to third scree
     n ***
1660 ERASE scrn$:DIM scrn$(20,25)
1670 restart=1
1680 lost= REMAIN (3):RESTORE 2170:RETUR
     N
1690     REM *** restores to forth scree
     n ***
1700 ERASE scrn$:DIM scrn$(20,25)
1710 restart=1
1720 lost= REMAIN (3):RESTORE 2210:RETUR
     N
1730     REM *** you've lost a life ***
1740 char=184:ENV 1,5,3,1,1,0,90,5,-3,2:
     ENT 1,50,20,2,50,20,1:SOUND 2,60,0,
     0,1,1:RETURN
1750     REM *** pick up time bomb ***
1760 DI:lost= REMAIN (3):scr=scr+(50*poi
     nts):char=184:DI:LOCATE 1,2:PEN 7:P
     RINT scr:EI:tbp=0
1770 ENT 13,127,-1,1,127,-1,1,1,127,1,1,
     127,1:SOUND 1,300,250,15,0,13:WHILE
      SQ(1)<>4:WEND:RETURN
1780     REM *** end of game play again
   ? ***
```

```
1790 GOSUB 1920
1810 fini=0:CLS:IF scr>hscr THEN hscr=sc
     r
1820 LOCATE 1,1:PEN 6:PRINT"score ";scr:
     LOCATE 1,4:PRINT"hi score ";hscr
1830 LOCATE 3,12:PEN 14:PRINT"TERRORIST
     ATTACK"
1840 LOCATE 5,14:PEN 15:PRINT"by A.R.WHI
     TE"
1850 LOCATE 2,18:PEN 6:PRINT"another gam
     e (y/n)"
1860 a$=INKEY$ :IF a$="" THEN 1860
1870 IF a$="n" OR a$="N" THEN MODE 1:CLE
     AR:END
```

```
1880 IF a$="y" OR a$="Y" THEN RESTORE:ga
     me=1:ERASE scrn$:CALL &BCA7:RETURN
1890 GOTO 1860
1900 fini=1:RETURN
1910     REM *** explosion ***
1920 lost =REMAIN (3):tbp=0:FOR z=1 TO 1
     000:NEXT z:ENV 1,1,15,1,1,0,100,5,-
     1,10,5,-1,10,5,-1,10:ENT -1,5,1,1,1
     0,-1,1,5,1,1
1930 ENV 2,1,15,1,1,0,100,5,-1,10,5,-1,1
     0,5,-1,10:ENT -2,5,1,1,10,-1,1,5,1,
     1
1940 ENV 3,1,0,50,1,15,1,1,0,100,5,-1,10
     ,5,-1,10:ENT -3,5,1,1,10,-1,1,5,1,1
1950 SOUND 65,100,251,0,1,1,15
1960 SOUND 66,678,251,0,2,2,15
1970 SOUND 68,1000,251,0,3,3,15
1980 RELEASE 7
1990 FOR n=1 TO 5:INK 1,6:FOR z=1 TO 200
     :NEXT z:INK 1,26:FOR z=1 TO 200:NEX
     T z:NEXT n:RETURN
2000     REM *** initialise time bomb **
     *
2010 tbp=1
2020 RANDOMIZE (TIME):tbt= INT (RND (4)*
     10):IF tbt<1 OR tbt>5 THEN 2020
```

```
2030 IF tbt=1 THEN del=300:GOTO 2080
2040 IF tbt=2 THEN del=600:GOTO 2080
2050 IF tbt=3 THEN del=1500::GOTO 2080
2060 IF tbt=4 THEN del=1000:GOTO 2080
2070 IF tbt=5 THEN tbt=0:tbp=0:del=0:RET
     URN
2080 AFTER del,3 GOSUB 1420:RETURN
2090 DATA 3,4,5,6,7,8,9,10,11,12,13,14,1
     5,16,17,18,19,20,21,22,23,24,3,6,10
     ,24,3,6,10,19,24,3,10,12,13,15,16,1
     9,24,3,8,9,10,12,16,19,24,3,4,5,6,8
     ,12,14,16,21,24,3,8,12,16,21,24,3,5
     ,6,7,8,10,11,12,13,15,16,17,19,20,2
     1,24
2100 DATA 3,8,10,13,15,21,24,3,4,5,6,8,1
     3,15,21,24,3,8,10,11,13,14,15,16,17
     ,19,24,3,11,19,24,3,7,8,9,11,13,14,
     15,16,19,24,3,11,13,16,24,3,4,5,6,7
     ,8,9,10,11,13,16,17,18,19,20,21,22,
     23,24
2110 DATA 3,6,10,13,24,3,6,8,13,17,18,19
     ,20,21,24,3,8,9,17,24,3,5,6,7,8,11,
     12,13,14,15,16,17,19,20,21,24,3,4,5
     ,6,7,8,9,10,11,12,13,14,15,16,17,18
     ,19,20,21,22,23,24
2120 DATA 2,4,2,7,2,14,9,4,9,11,9,16,10,
     14,14,10,19,4,19,9,19,18,8,23,19,23
     ,2,22,11,4,16,4
2130 DATA 3,4,5,6,7,8,9,10,11,12,13,14,1
     5,16,17,18,19,20,21,22,23,24,3,10,1
     9,21,24,3,4,6,7,8,10,12,14,15,16,17
     ,19,21,22,24,3,8,12,17,24,3,4,5,6,8
     ,9,10,11,12,13,14,15,17,17,18,19,20
     ,21,22,24
```

```
2140 DATA 3,24,3,6,7,8,9,10,11,12,14,15,
     16,17,18,19,20,24,3,6,20,21,22,24,3
     ,6,8,9,10,11,12,13,14,15,16,17,18,2
     0,24,3,6,8,18,20,24,3,6,8,10,11,12,
     14,15,16,18,24,3,6,8,18,20,24
2150 DATA 3,6,10,11,12,14,15,16,18,20,24
     ,3,6,8,18,20,22,23,24,3,6,8,9,10,11
     ,12,13,14,15,17,18,20,24,3,6,20,24,
     3,6,7,8,9,10,11,12,13,14,15,16,17,1
     8,19,20,21,22,24,3,24,3,24,3,4,5,6,
     7,8,9,10,11,12,13,14,15,16,17,18,19
     ,20,21,22,23,24
2160 DATA 2,4,2,20,4,16,6,4,8,7,10,15,12
     ,13,14,4,15,23,16,13,19,14,11,23,2,
     22,4,4,15,22,12,14
2170 DATA 3,4,5,6,7,8,9,10,11,12,13,14,1
     5,16,17,18,19,20,21,22,23,24,3,24,3
     ,5,6,7,8,9,10,11,13,14,15,16,17,18,
     19,20,21,22,24,3,5,11,16,17,18,19,2
     0,21,22,24,3,5,6,7,8,9,11,13,14,19,
     20,21,22,24
```

```
2180 DATA 3,13,14,15,16,17,24,3,4,5,6,7,
     8,9,10,11,17,18,19,20,21,24,3,12,13
     ,14,15,19,24,3,5,6,7,8,9,10,15,16,1
     7,19,21,24,3,10,12,13,17,19,21,24,3
     ,6,7,8,9,10,13,14,15,17,19,21,22,24
     ,3,5,10,11,24
2190 DATA 3,5,6,7,8,11,12,13,14,15,16,17
     ,18,19,21,22,24,3,8,11,12,13,14,22,
     24,3,5,6,7,8,20,21,22,24,3,5,10,11,
     12,13,14,15,16,17,19,24,3,5,10,13,1
     9,20,21,22,24,3,7,8,10,12,13,14,15,
     16,17,19,24
2200 DATA 3,5,6,7,8,10,19,21,22,24,3,4,5
     ,6,7,8,9,10,11,12,13,14,15,16,17,18
     ,19,20,21,22,23,24,4,6,5,16,7,16,9,
     13,10,9,12,6,14,7,16,20,17,12,17,14
     ,19,4,8,23,19,20,2,7,19,9,11,12
2210 DATA 3,4,5,6,7,8,9,10,11,12,13,14,1
     5,16,17,18,19,20,21,22,23,24,3,6,8,
     12,24,3,6,8,10,12,13,14,15,16,18,20
     ,21,22,24,3,6,8,10,12,16,18,20,24,3
     ,6,8,10,14,18,20,21,24,3,8,10,11,12
     ,13,14,15,16,17,18,21,24
```

```
2220 DATA 3,5,6,7,8,19,21,22,24,3,10,11,
     12,13,14,16,17,18,19,22,24,3,5,6,7,
     8,14,16,20,22,24,3,5,6,8,10,11,12,1
     4,16,18,19,20,22,24,3,5,6,8,12,14,1
     6,22,24,3,5,6,8,12,14,16,17,18,19,2
     0,21,22,24
2230 DATA 3,5,6,8,10,11,12,14,24,3,8,14,
     16,17,18,19,20,21,22,23,24,3,5,6,7,
     8,9,10,11,12,13,14,24,3,8,13,14,16,
     18,19,20,21,22,24,3,8,10,11,12,13,1
     4,16,22,24,3,5,6,7,8,10,11,12,13,14
     ,16,17,18,19,20,21,22,24
2240 DATA 3,24,3,4,5,6,7,8,9,10,11,12,13
     ,14,15,16,17,18,19,20,21,22,23,24,2
     ,7,2,13,4,21,5,17,9,19,10,7,11,11,1
     6,12,17,7,17,21,19,4,5,23,2,4,2,23,
     13,15,5,15
2250 DATA 113,106,190,106,113,106,113,12
     7,113,127,142,127
2260 DATA 113,106,190,106,113,106,113,12
     7,113,127,142,150
2270 DATA 113,106,190,106,113,106,113,12
     7,113,127,142,127
2280 DATA 142,127,113,106,113,127,113,12
     7,142,113,127,142,-1
2290 DATA 142,1,190,1,169,1,169,0,142,1,
     190,1,169,1,169,0,106,1,113,1,127,1
     ,142,1,-1,-1
```

News for serious users of Amstrad computers

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* Sort by embedded key, e.g. surname within "Mr. J K Smith"
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is published by AMSOFT and comes with a detailed manual. It is available from AMSOFT, or from:
Campbell Software Design Ltd (Dept AU), 57 Trap's Hill, Loughton, Essex IG10 1TD

Nevada Cobol

REVIEWED by Steven Godwin.

Around 1966, Grace Hopper (who coined the phrase "bug", when she found that the reason for a program crash was a dead insect shorting out a relay) created a high level language for the American Department of Defence and called it Cobol; an acronym for Common Business Oriented Language. Its main advantage is that the program source code is very close to English, which makes it very easy to read and therefore de-bug. This, among other reasons is why Cobol is still widely used for writing business applications.

Unlike most implementations of Basic, which are interpreted, Cobol is compiled. The difference being, that interpreting a program means turning every instruction of the program into machine code as it is run, as opposed to turning the whole program into machine code before running it, as compiling does. The main difference between these two methods is speed. As no conversion work has to be done during the running of a compiled program, it executes much faster.

Cobol is available only for a few home micros, but due to the availability of CP/M on the Amstrad machines, it is now another language option, open to the serious Amstrad user. Although Cobol is faster than Basic, do not go and buy it thinking that you will be writing super fast, graphics and arcade games. Cobol is a business language and has little or no support for graphics.

The implementation of Cobol available on the Amstrad, is Nevada Cobol. It is one of the more popular versions of the language, if not the most complete. Other versions, such as CIS and Microsoft have larger and more powerful instruction sets, but do cost many times more.

Cobol is quite a verbose language and at first sight seems over complicated. To demonstrate, a program to input and then print a person's name would be.

```
0001   IDENTIFICATION DIVISION.
0002   PROGRAM-ID. DEMONSTRATION.
0003   AUTHOR.     BOD.
0004   ENVIRONMENT DIVISION.
0005   CONFIGURATION SECTION.
0006   SOURCE-COMPUTER. AMSTRAD CPC464.
0007   OBJECT-COMPUTER. ANY CPM COMPUTER.
0008   INPUT-OUTPUT SECTION.
0009   FILE-CONTROL.
0010          SELECT PRINT-OUT ASSIGN PRINTER.
0011   DATA DIVISION.
0012   FILE SECTION.
0013   FD PRINT-OUT LABEL RECORDS ARE STANDARD
0014                VALUE OF FILE-ID "A:PRINTER".
0015   01 PRINT-IT.
0016      03 PRINT-MESS     PIC X(13).
0017      03 PRINT-NAME     PIC X(10).
0018   WORKING-STORAGE SECTION.
0019   01 NAME              PIC X(10).
0020   PROCEDURE DIVISION.
0021   MAIN SECTION.
0022   M10.
0023       DISPLAY "PLEASE ENTER YOUR NAME ".
0024       ACCEPT NAME.
0025       OPEN OUTPUT PRINT-OUT.
0026       MOVE "YOUR NAME IS " TO PRINT-MESS.
0027       MOVE NAME TO PRINT-NAME.
0028       WRITE PRINT-IT.
0029       CLOSE PRINT-OUT.
0030       STOP RUN.
0031   END PROGRAM DEMONSTRATION.
```

(Please note. The line numbers are only for de-bugging and are not used like Basic line numbers within the program.)

As you can see, this is a bit more long winded than it would be in Basic, but do not be intimidated. The start of the program (The IDENTIFICATION DIVISION), contains data for anyone looking at the source code and shows what the program is, and who wrote it. This is followed by the ENVIRONMENT DIVISION that contains more data for the programmer about what computer the software was written on and what hardware is needed to run it. This division may also have an input-output section containing details about any files to be used in the program. The above example also contains "file-control" that tells the computer facts about files to be used. This information includes the type of file (usually disc or printer) and for disc files, the type of file to be used, be it Sequential or Relative, the access type, be it sequential or random, as well as relative file key, and file status variable assignments.

Cobol differs from Basic in that all data used must be declared at the start of the program, in the next division, the DATA DIVISION. As well as defining all internal data, all files (disc, printer etc.) must also be defined in detail. This makes structuring of data clear and easy to read. The first part of the Data division only exists if there are any files and is, not unexpectedly, called the File section. As an example, a file that had records containing a name, a three line address and a post code would look like this.

```
FD NAME-ADDRESS-FILE LABEL RECORDS ARE STANDARD
                     VALUE OF FILE-ID IS
                    "A:ADDRESS.DAT".
01 NAME-AND-ADDRESS.
   03 NAME.
      05 FORENAME       PIC X(10).
      88 FRED           VALUE "FRED".
      05 FILLER         PIC X.
      05 SURNAME        PIC X(10).
   03 ADDRESS-LINE      OCCURS 3 TIMES PIC X(20).
   03 POST-CODE         PIC X(8).
```

The first two lines are the file definition and give more information about the file including the name to be used when accessing the disc. The number at the start of each line is a level number. The higher the number is, the lower the level. Above, the level NAME-AND-ADDRESS, which is a level 01, contains all the other data, and by the same token, all the data from the FORENAME to the SURNAME is contained within NAME. Therefore, referring to NAME would include the forename and surname(together with a separating space). The X(number) on most of the lines refers to the data to be held in each data name. The X tells the compiler that the data is alphanumeric, and could be replaced by such characters as 9,Z or . to denote numeric data, leading zero supression and a decimal point respectively. Other options include holding numbers in packed decimal or in binary form.

The number in the brackets is just shorthand. Instead of a ten character data name being defined by PIC XXXXXXXXXX, you can put PIC X(10). The data name FILLER is commonly used in Cobol and is recognised by the compiler as memory that must be reserved (in this case for a space between the two names), but which does not have to be specifically referenced. There is also a VALUE verb that could be used to fill any data names with specific data at the start of the program. The variable FRED, is an 88 level, which is an exception to the rule of level numbers, and will be explained later.

As you can see, there is only one address line mentioned, although there should be three. This is due to the OCCURS statement. It is similar to a Basic subscript and means that the data may be referred to in the main code as ADDRESS(X), where X is the line of the address that you are referring to.

This File section is followed by a WORKING-STORAGE SECTION. This has exactly the same structure (without the FD's) and defines all the data to be used within the program (the same is a variable is Basic).

After all the data has been defined, the actual program code is entered in the final program division, called the PROCEDURE DIVISION. Apart from the actual instructions, there are SECTION and PARAGRAPH headers. These are two levels of label used by Cobol. A section may contain many paragraphs and is shown as a label followed by the word SECTION. The compiler can differentiate between labels and program statements by their position.

A label will start in the A field whereas program statements start in the B field. In Nevada Cobol, the A field is columns 6 to 9 of the line and the B field is columns 10 to 70. Most other versions of Cobol however, use columns 8 to 11 and 12 to 72 respectively. A nice feature of Nevada Cobol, is that it looks at the first line of your program and decides which format you are using, and allows either.

The code can refer to labels by way of two statements. These are GO TO and PERFORM which act like GOTO and GOSUB in Basic. The GO TO statement transfers control of the program to the relevant part of the program as does the PERFORM statement, but with the latter, the following happens. If a SECTION was PERFORMed, then the program continues until either the end of that SECTION, or an EXIT statement is encountered. At this point, control of the program returns to the statement after the PERFORM. If a PARAGRAPH was PERFORMed, then control returns at the end of that PARAGRAPH.

Descisions may be made in Cobol using the IF verb. IF statements may be nested to form quite complicated structures.

```
IF NAME = "TOM"
        MOVE 1 TO X
    ELSE
        IF NAME = "DICK"
                MOVE 2 TO X
            ELSE
                MOVE "HARRY" TO NAME.
```

IF statements can be made more readable by "88 levels" in the DATA DIVISION. For example, the above IF statement could be written as:-

```
IF TOM
        MOVE 1 TO X
    ELSE
        IF DICK
                MOVE 2 TO X
            ELSE
                MOVE "HARRY" TO NAME.
```

Where the DATA DIVISION contains:-

```
01 NAME         PIC X(10).
88 TOM          VALUE "TOM".
88 DICK         VALUE "DICK".
```

"88 level's" are used a great deal in Cobol and as you can see they make programs more readable as there is less logic to wade through.

Most of the other cobol verbs are very self explanatory. Maths are done using the ADD, SUBTRACT, DIVIDE and MULTIPLY statements in the following format.

```
ADD A TO B.
ADD A B GIVING C.
SUBTRACT A FROM B GIVING C.
DIVIDE B INTO A.
MULTIPLY A BY B.
```

In Cobol, the answer to any mathematical function is held in the second data-name unless the GIVING verb is used to direct the answer elsewhere.

Putting any information onto the screen is done with the DISPLAY verb. In the form DISPLAY "TEXT" or DISPLAY data-name. By contrast, to use a printer, you must create a file, which must be defined in the ENVIRONMENT and DATA divisions. Then you must OPEN it, WRITE to it and then CLOSE it when you have finished (see example).

The Nevada Cobol package has one feature that I found annoying. Whereas other Cobol implementations produce a listing file when they are compiled that contains line numbers and a list of errors, Nevada source codes must be first passed through a program called "RENUMBER" to give it line numbers, as in the example program above, and then compiled. The compiler then tells you where the errors are and you must write them down and refer to the source code. If you have a printer then using control P to get an error listing is invaluable. Finally, although the manual shows an extensive list of error messages, most errors seem to be treated as "syntax errors" which makes de-bugging a slower business than it should be.

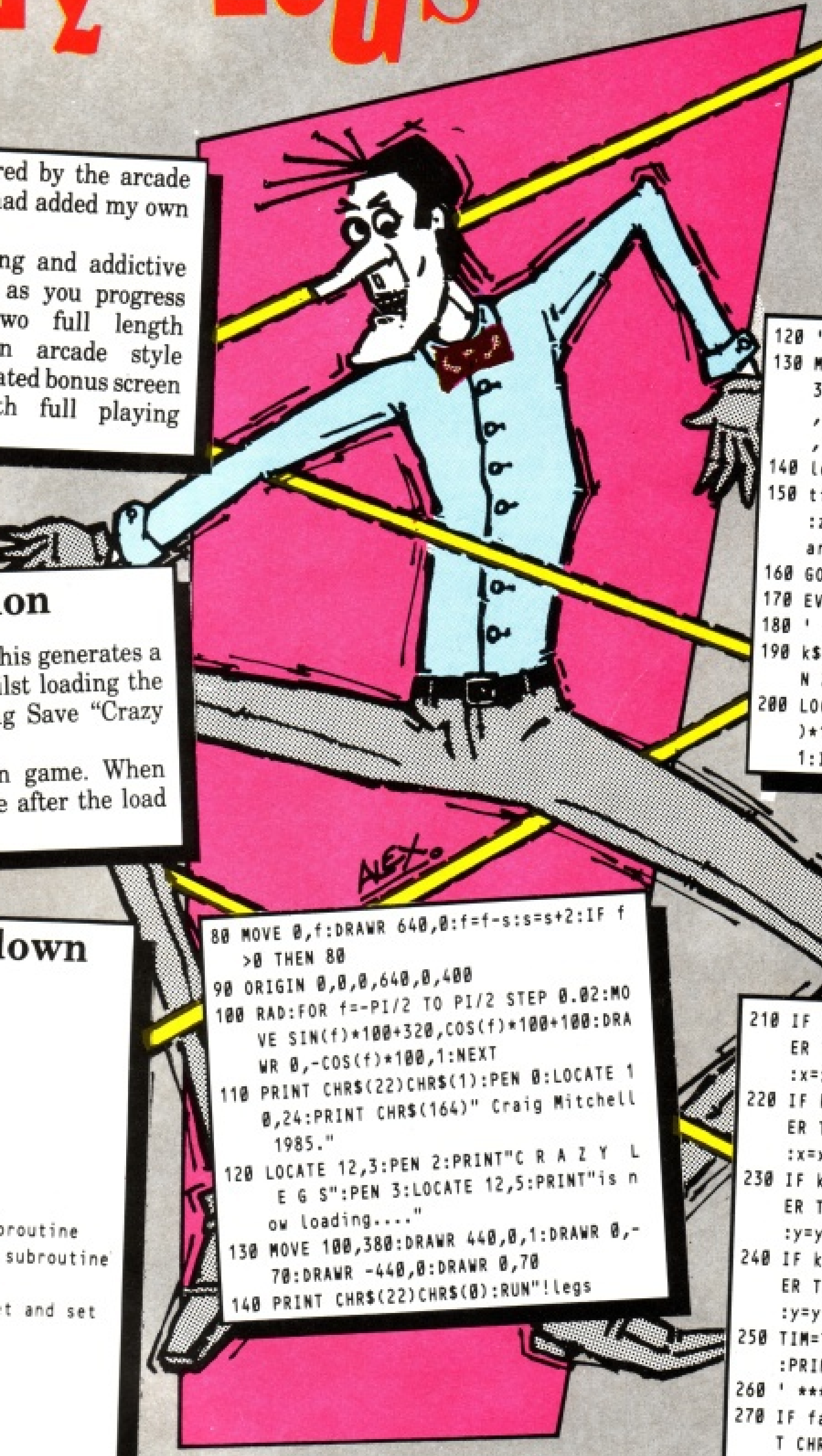
To sum up, if you want to write your own applications for your 464 (with disc) or 664, or just want a version of Cobol on your machine, then Nevada Cobol is very adequate and at only £39.95, compared with several hundred pounds for other versions, it constitutes very good value for money.



ACU

CRAZY LEGS

by Craig Mitchell



This program was inspired by the arcade game Q-Bert to which I had added my own features.

The game is fast moving and addictive becoming more difficult as you progress through the levels. Two full length multi-channel tunes, an arcade style high-score table and animated bonus screen are included along with full playing instructions.

Typing instruction

First type in program one, this generates a picture which is shown whilst loading the main game. Save by typing Save "Crazy Legs".

Program two is the main game. When typed in and debugged,save after the load program using save "legs".

Program breakdown

```
  60-110 Define user keys
 120-170 Begin new game
 180-250 Move player
 260-300 Animate faces
 310-340 Movement routine
 350-370 Test for teleport
 380-450 New disc colour
 460-500 Change disc colour
 510-570 Tune 1 interrupte subroutine
 580-650 X-Y Zapper interrupt subroutine
 660-720 Death rays
 730-1200 Redefine character set and set
          envelopes
1210-1220 Disc colour data
1230-1490 Title screen
1500-1900 Print isntructions
1910-1960 Wait for keypress
1970-2140 Print game screen
2150-2450 Level completionroutine
2460-2470 Scroll window up
2480-2530 Deth routine
2540-2910 Game over routine
2920-2970 Tune 2 interrupt subroutine
2980-3250 Read tune data
3260-3320 Data for tune 1
3330-3390 Data for tune 2
```

```
10 ' *** PROGRAM ONE ***
20 '  By Craig Mitchell
30 '
40 BORDER 1:INK 0,1:INK 1,24:INK 2,26:IN
   K 3,6:MODE 1
50 ORIGIN 0,0,0,640,0,98:CLG 3
60 FOR f=-300 TO 940 STEP 50:MOVE 320,20
   0:DRAW f,0,2:NEXT
70 f=104:s=2
```

```
80 MOVE 0,f:DRAWR 640,0:f=f-s:s=s+2:IF f
   >0 THEN 80
90 ORIGIN 0,0,0,640,0,400
100 RAD:FOR f=-PI/2 TO PI/2 STEP 0.02:MO
    VE SIN(f)*100+320,COS(f)*100+100:DRA
    WR 0,-COS(f)*100,1:NEXT
110 PRINT CHR$(22)CHR$(1):PEN 0:LOCATE 1
    0,24:PRINT CHR$(164)" Craig Mitchell
     1985."
120 LOCATE 12,3:PEN 2:PRINT"C R A Z Y  L
     E G S":PEN 3:LOCATE 12,5:PRINT"is n
    ow loading...."
130 MOVE 100,380:DRAWR 440,0,1:DRAWR 0,-
    70:DRAWR -440,0:DRAWR 0,70
140 PRINT CHR$(22)CHR$(0):RUN"!legs
```

```
10 '*********** PROGRAM TWO ***********
20 '*      CRAZY-LEGS  WRITTEN BY       *
30 '*          CRAIG MITCHELL           *
40 '***********************************
50 '
60 ' ***** DEFINE USER KEYS *****
70 DEFINT a-z:KEY DEF 76,0,0,0,0
80 CLG 0
90 KEY 139,"mode 2:paper 0:pen 1:border
   13:ink 0,13:ink 1,0:cls:list"+CHR$(13
   ):KEY 138,"save"+CHR$(34)+"main prog"
   +CHR$(34)+CHR$(13):GOSUB 750:GOSUB 29
   90
100 SPEED KEY 20,1
110 GOSUB 1240
```

```
120 ' ***** BEGIN NEW GAME *****
130 MODE 0:INK 0,0:INK 1,26:INK 2,6:INK
    3,2:INK 4,18:INK 5,24:INK 6,15:INK 7
    ,16:INK 8,7:INK 12,1:INK 13,9:INK 14
    ,13:INK 15,24
140 lev=1:sc=0:men=3:in=40:stim=900
150 tim=stim:x=10:y=16:chr=248:z1=2:z2=8
    :z1d=1:z2d=1:PAPER #1,0:PEN #1,2:EI:
    area=0:fd=0
160 GOSUB 1980
170 EVERY in GOSUB 600
180 ' ***** MOVE PLAYER *****
190 k$=LOWER$(INKEY$):j=JOY(0):IF fd THE
    N 2490
200 LOCATE x,y:PAPER TEST((x-1)*32,(26-y
    )*16):PEN 1:PRINT CHR$(chr):chr=chr+
    1:IF chr=252 THEN chr=248
```

```
210 IF k$="z" OR j=4 THEN LOCATE x,y:PAP
    ER TEST((x-1)*32,(26-y)*16):PRINT" "
    :x=x-4:GOTO 320
220 IF k$="x" OR j=8 THEN LOCATE x,y:PAP
    ER TEST((x-1)*32,(26-y)*16):PRINT" "
    :x=x+4:GOTO 320
230 IF k$="p" OR j=1 THEN LOCATE x,y:PAP
    ER TEST((x-1)*32,(26-y)*16):PRINT" "
    :y=y-4:GOTO 320
240 IF k$="l" OR j=2 THEN LOCATE x,y:PAP
    ER TEST((x-1)*32,(26-y)*16):PRINT" "
    :y=y+4:GOTO 320
250 TIM=TIM-1:LOCATE 15,4:PAPER 0:PEN 13
    :PRINT tim:IF TIM<1 THEN 2490
260 ' ***** ANIMATE FACES *****
270 IF face=0 THEN PEN 5:LOCATE 3,1:PRIN
    T CHR$(224):LOCATE 18,1:PRINT CHR$(2
    25)
280 IF face=10 THEN PEN 5:LOCATE 3,1:PRI
    NT CHR$(225):LOCATE 18,1:PRINT CHR$(
    224)
290 face=face+1:IF face=20 THEN face=0
300 GOTO 190
310 ' ***** MOVEMENT ROUTINE *****
320 SOUND 1,160,-1,0,2,1:IF x<2 OR x>18
    OR y<8 OR y>24 THEN 2490
330 lb=(lev-1) MOD 3:f1=0
340 col=TEST((x-1)*32,(26-y)*16)
350 ' ***** TEST FOR TELEPORT *****
360 IF col=0 THEN x=INT(RND*5)*4+2:y=INT
    (RND*5)*4+8:f1=1:GOTO 340
370 IF f1 THEN SOUND 1,70,-2,15,2,3,31:s
    c=sc-50:IF sc<0 THEN sc=0
380 ' ***** NEW DISC COLOUR *****
390 IF lb=0 AND col=9 THEN ncol=11:area=
    area+1:sc=sc+10:GOTO 470
```

· THE NEW AMSTRAD CPC 664 WITH BUILT-IN DISC DRIVE



· AVAILABLE AT BOOTS · COMET · CURRYS · DIXONS · GREENS · JOHN MENZIES · RUMBELOWS

THE LOW COST COMPUTER FOR HOME AND BUSINESS ·

If you know anything about computers you'll know that disc drives are up to fifty times faster than cassette when you're loading and saving programs. In fact, a disc drive makes computing faster, more reliable, more efficient and more fun. But up till now the only way to gain these advantages for a home computer was to buy a separate disc drive attachment. Now Amstrad are pleased to announce the first complete home computer with built-in disc drive: The Amstrad CPC 664.

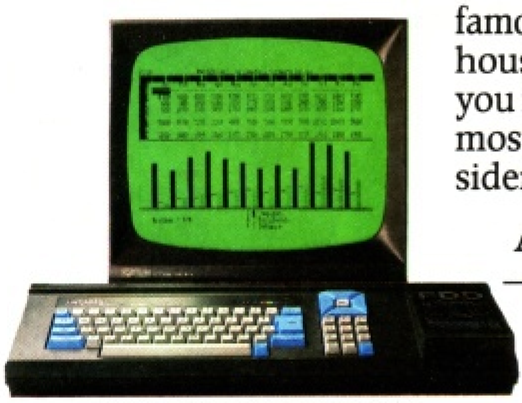
And when you buy a CPC 664 you'll find it's not just the disc drive that's built-in.

You'll get everything you need, including a monitor (green screen or full colour). We'll even give you a free CPM and Logo disc, so all you do is plug in and you're in business.



WITH COLOUR MONITOR AROUND

· £449 ·



WITH GREEN SCREEN AROUND

· £339 ·

THE HOME COMPUTER THAT MEANS BUSINESS.

BUSINESS OR · PLEASURE ·

Although a disc drive will make games more fun (and there are loads of them to choose from) it also makes the CPC 664 a serious proposition for the business user.

There are accounting, word-processing, spread-sheet and database programs (to name but a few).



Amsoft Business Control, is a complete suite of programs for integrated sales invoicing, stock control and sales ledger for around £99. (Requires an additional FD-1 disc drive around £159 and DL-2 cable around £7).

The CPC 664 is also supplied with CP/M* to help make your business more efficient and effective by providing access to the famous range of CP/M* software.



Wordprocessing with Amsword can improve the productivity of everyone from unskilled typist to trained secretary. Around £23.95.

HIGH PERFORMANCE · LOW COST ·

The one thing you won't need a computer to work out is that the Amstrad CPC 664 represents outstanding value for money.

You only have to check the cost of buying all the elements separately (64K computer, disc-drive, monitor) to realise that the Amstrad package is very hard to beat.

With a green screen monitor the cost is just £339. With a full colour screen it costs £449. And after you've saved money on the price of the computer itself, you go on saving on the price of software.

There are hundreds of programs for business or pleasure available on disc (and cassette) to CPC 664 users. Many from Amsoft, others from other famous-name software houses. Few will cost you more than £49 and most will cost you considerably less.

AN EXPANDING · SYSTEM ·

There is a complete range of peripherals available to CPC 664 users which plug directly into the built-in interfaces.

These include a joystick, additional disc drive (to double your on-line storage) and the Amstrad DMP-1 dot-matrix printer. (There's also a cassette interface so that you can use CPC 464 programs on tape). And there are many more peripherals from Amstrad and other manufacturers which can be used to enhance the CPC 664.

· AMSTRAD USER CLUB ·

Join the optional Amstrad User Club and we'll keep you informed with our monthly user magazine, and information on all software as it is introduced. Your membership details will be recorded on your personal club card, which entitles members to various privileges and offers.



Figure analysis made easy with Microspread. An easy to use spreadsheet with pull-down menus and a wide range of mathematical options. Around £49.



Please send me more information

Name ____________________

Address ____________________

____

____

Amstrad CPC 664

Amstrad, P.O. Box 462, Brentwood, Essex CM14 4EF.

*CP/M is a trademark of Digital Research Inc.

SPECTRUM · W.H. SMITH · WIGFALLS · AND GOOD INDEPENDENT COMPUTER STORES ·

```
400 IF lb=1 AND col=9 THEN ncol=10:sc=sc+10:GOTO 470
410 IF lb=1 AND col=10 THEN ncol=11:area=area+1:sc=sc+10:GOTO 470
420 IF lb=2 AND col=9 THEN ncol=10:sc=sc+10:GOTO 470
430 IF lb=2 AND col=10 THEN ncol=11:sc=sc+10:area=area+1:GOTO 470
440 IF lb=2 AND col=11 THEN ncol=9:area=area-1:GOTO 470
450 GOTO 190
460 ' ***** CHANGE DISC COLOUR *****
470 PAPER 0:LOCATE x-1,y-1:PEN ncol:PRINT CHR$(240)CHR$(143)CHR$(241):LOCATE x-1,y:PRINT CHR$(143)CHR$(143)CHR$(143):LOCATE x-1,y+1:PRINT CHR$(242)CHR$(143)CHR$(243)
480 LOCATE 7,3:PEN 13:PRINT sc
490 IF area=24 THEN 2170
500 GOTO 190
510 ' ***** TUNE 1 INTERRUPT *****
520 ' *****   SUBROUTINE    *****
530 IF NOT SQ(1) AND 2 THEN SOUND 1,t1(n1,0,0),t1(n1,1,0),15,3:n1=n1+1:IF n1=84 THEN n1=0:AFTER 200 GOSUB 530
540 IF ic THEN INK 2,c1:c1=c1+1:IF c1=27 THEN c1=1
550 IF NOT SQ(4) AND 2 THEN SOUND 4,t1(n2,0,1),t1(n2,1,1),5:n2=n2+1:IF n2=105 THEN n2=0:AFTER 200 GOSUB 530
560 AFTER 8 GOSUB 530
570 RETURN
580 ' ***** X-Y ZAPPER INTERRUPT *****
590 ' *****   SUBROUTINE    *****
600 LOCATE#1,z1,6:PRINT#1," ":LOCATE#1,20,z2:PRINT#1," "
610 z1=z1+z1d:IF z1=18 OR z1=2 THEN z1d=-z1d
620 z2=z2+z2d:IF z2=24 OR z2=8 THEN z2d=-z2d
630 LOCATE #1,z1,6:PRINT#1,CHR$(253):LOCATE #1,20,z2:PRINT#1,CHR$(252)
640 IF (z1-2)/4<>(z1-2)\4 THEN EI:RETURN
650 IF RND>0.7 THEN RETURN
660 ' ***** DEATH RAYS *****
670 PRINT#1,CHR$(30)CHR$(23)CHR$(1)
680 SOUND 130,10,-1,15,1,2
690 FOR l=1 TO 4:MOVE (z1-1)*32+17,304:DRAWR 0,-303,1:DRAWR -4,0:DRAWR 0,303:MOVE 607,(26-z2)*16-10:DRAWR -607,0:DRAWR 0,2:DRAWR 607,0:NEXT l
700 PRINT#1,CHR$(30)CHR$(23)CHR$(0)
710 IF z1=x OR z2=y THEN fd=1
720 RETURN
730 ' ***** REDEFINE CHARATER SET *****
740 ' *****   AND SET ENVELOPES   *****
750 SYMBOL AFTER 32
760 SYMBOL 48,124,254,206,214,230,254,124,0
770 SYMBOL 49,24,56,120,24,24,126,126,0
780 SYMBOL 50,124,254,142,56,112,254,254,0
790 SYMBOL 51,124,254,134,30,134,254,124,0
800 SYMBOL 52,64,200,216,254,126,24,24,0
810 SYMBOL 53,254,254,192,124,6,198,124,0
820 SYMBOL 54,126,192,252,254,198,254,124,0
830 SYMBOL 55,254,254,206,28,56,112,224,6
840 SYMBOL 56,124,254,198,124,198,254,124,0
850 SYMBOL 57,124,254,198,254,126,6,252,0
860 SYMBOL 65,124,254,198,254,254,198,198,0
870 SYMBOL 66,252,254,198,252,198,254,252,0
880 SYMBOL 67,124,254,198,192,198,254,124,0
890 SYMBOL 68,248,252,206,198,206,252,248,0
900 SYMBOL 69,126,254,192,252,192,254,126,0
910 SYMBOL 70,126,254,192,248,248,192,192,0
920 SYMBOL 71,124,254,192,220,198,254,124,0
930 SYMBOL 72,68,198,198,254,254,198,198,0
940 SYMBOL 73,126,60,24,24,24,60,126,0
950 SYMBOL 74,6,6,6,198,198,254,124,0
960 SYMBOL 75,204,220,248,240,248,220,206,0
970 SYMBOL 76,192,192,192,192,192,254,124,0
980 SYMBOL 77,68,238,254,254,214,198,198,0
990 SYMBOL 78,68,230,246,254,222,206,68,0
1000 SYMBOL 79,124,254,238,198,238,254,124,0
1010 SYMBOL 80,124,254,198,254,252,192,192,0
1020 SYMBOL 81,124,254,238,198,218,236,118,0
1030 SYMBOL 82,124,254,198,252,248,220,206,0
1040 SYMBOL 83,124,254,192,124,6,254,124,0
1050 SYMBOL 84,252,252,180,48,48,48,48,0
1060 SYMBOL 85,68,198,198,198,238,254,124,0
1070 SYMBOL 86,68,198,198,238,124,56,16,0
1080 SYMBOL 87,68,198,198,214,214,254,108,0
1090 SYMBOL 88,198,238,124,56,124,238,198,0
1100 SYMBOL 89,68,198,238,124,56,56,56,0
1110 SYMBOL 90,252,254,28,56,112,254,126,0
1120 SYMBOL 252,0,7,30,124,248,124,30,7
1130 SYMBOL 253,65,99,119,62,62,28,28,8
1140 SYMBOL 240,3,15,31,63,127,127,255,255
1150 SYMBOL 241,192,240,248,252,254,254,255,255
1160 SYMBOL 242,255,255,127,127,63,31,15,3
1170 SYMBOL 243,255,255,254,254,252,248,240,192
1180 DIM disc(2,2):RESTORE 1220:FOR f=0 TO 2:FOR g=0 TO 2:READ disc(f,g):NEXT g,f
1190 ENV 1,15,-1,20:ENV 2,15,1,1:ENT 1,15,-10,1:ENT -2,1,10,1:ENT -3,10,5,1,10,-5,1:ENV 3,15,-1,5:ENV 4,1,-15,1,15,1,1,6,-1,2
1200 RETURN
1210 ' ***** DISC COLOUR DATA *****
1220 DATA 10,0,5,8,1,2,16,2,3
1230 ' ***** TITLE SCREEN *****
1240 INK 0,0:INK 1,26:INK 3,2:PAPER 0:MODE 1:CLS:BORDER 0:ic=1
1250 LOCATE 2,19:PEN 1:PAPER 2:PRINT CHR$(135)STRING$(36,CHR$(131))CHR$(139)
1260 FOR f=20 TO 23:LOCATE 2,f:PRINT CHR$(133):LOCATE 39,f:PRINT CHR$(138):NEXT f
1270 LOCATE 2,24:PRINT CHR$(141)STRING$(36,CHR$(140))CHR$(142)
1280 PAPER 0:PEN 3:LOCATE 4,21:PRINT"DESIGN & PROGRAM BY CRAIG MITCHELL"
1290 LOCATE 18,22:PRINT CHR$(164)" 1985"
1300 PRINT CHR$(22)CHR$(1):LOCATE 11,24:PEN 0:PRINT"INSTRUCTIONS (Y/N) ?"CHR$(22)CHR$(0)
1310 PAPER 0
1320 n1=0:n2=0:GOSUB 530
1330 FOR x=200 TO 239:a$=CHR$(x)
1340 PEN 2:FOR f=11 TO 7 STEP -1:LOCATE f,2:PRINT a$:NEXT f:FOR f=3 TO 8:LOCATE 7,f:PRINT a$:NEXT f:FOR f=8 TO 11:LOCATE f,8:PRINT a$:NEXT f
1350 FOR f=8 TO 2 STEP -1:LOCATE 13,f:PRINT a$:NEXT f:FOR f=14 TO 16:LOCATE f,2:PRINT a$:NEXT f:FOR f=3 TO 4:LOCATE 16,f:PRINT a$:NEXT f:FOR f=15 TO 14 STEP -1:LOCATE f,4:PRINT a$:NEXT f
1360 FOR f=5 TO 6:LOCATE 15,f:PRINT a$:NEXT f:FOR f=7 TO 8:LOCATE 16,f:PRINT a$:NEXT f
1370 FOR f=8 TO 2 STEP -1:LOCATE 18,f:PRINT a$:NEXT f:FOR f=19 TO 21:LOCATE f,2:PRINT a$:NEXT f:FOR f=3 TO 8:LOCATE 21,f:PRINT a$:NEXT f:FOR f=19 TO 20:LOCATE f,5:PRINT a$:NEXT f
1380 FOR f=23 TO 27:LOCATE f,2:PRINT a$:NEXT f:FOR f=0 TO 4:LOCATE 27-f,3+f:PRINT a$:NEXT f:FOR f=23 TO 27:LOCATE f,8:PRINT a$:NEXT f
1390 FOR f=0 TO 2:LOCATE 29+f,2+f:PRINT a$:NEXT f:FOR f=0 TO 1:LOCATE 32+f,3-f:PRINT a$:NEXT f:FOR f=4 TO 8:LOCATE 31,f:PRINT a$:NEXT f
1400 FOR f=10 TO 16:LOCATE 10,f:PRINT a$:NEXT f:FOR f=11 TO 13:LOCATE f,16:PRINT a$:NEXT f
1410 FOR f=18 TO 15 STEP -1:LOCATE f,10:PRINT a$:NEXT f:FOR f=11 TO 16:LOCATE 15,f:PRINT a$:NEXT f:FOR f=16 TO 17:LOCATE f,13:PRINT a$:NEXT f:FOR f=16 TO 18:LOCATE f,16:PRINT a$:NEXT f
1420 FOR f=24 TO 20 STEP -1:LOCATE f,10:PRINT a$:NEXT f:FOR f=11 TO 16:LOCATE 20,f:PRINT a$:NEXT f:FOR f=21 TO 24:LOCATE f,16:PRINT a$:NEXT f:FOR f=15 TO 13 STEP -1:LOCATE 24,f:PRINT a$:NEXT f:LOCATE 23,13:PRINT a$
1430 FOR f=30 TO 26 STEP -1:LOCATE f,10:PRINT a$:NEXT f:FOR f=11 TO 13:LOCATE 26,f:PRINT a$:NEXT f:FOR f=27 TO 30:LOCATE f,13:PRINT a$:NEXT f:FOR f=14 TO 16:LOCATE 30,f:PRINT a$:NEXT f
1440 FOR f=29 TO 26 STEP -1:LOCATE f,16:PRINT a$:NEXT f
1450 k$=LOWER$(INKEY$)
1460 IF k$="y"THEN re=REMAIN(0):SOUND 135,0,0,1:GOTO 1510
1470 IF k$="n"THEN re=REMAIN(0):SOUND 135,0,0,1:CLS:RETURN
1480 k$=LOWER$(INKEY$):IF k$<>""THEN 1460
1490 NEXT x:GOTO 1330
1500 ' ***** PRINT INSTRUCTIONS *****
1510 MODE 1:INK 0,6:BORDER 6:INK 1,26:INK 2,0:INK 3,24:PAPER 0:CLS
1520 PEN 1:LOCATE 16,1:PRINT"CRAZY LEGS":LOCATE 15,2:PEN 2:PRINT STRING$(12,208)
```

```
1530 PRINT:PEN 3:PRINT" THE OBJECT OF TH
     E GAME IS TO COLOUR ALL":PRINT"THE
     DISCS ON THE GRID TO THE SAME COLOU
     R":PRINT"AS THE FOUR SMALL REFERENC
     E DISCS":PRINT:PRINT"CLUSTERED AROU
     ND THE CENTRE, IN DOING SO"
1540 PRINT"YOU RECEIVE A TIME BONUS AND
     PROCEDE TO":PRINT:PRINT"THE NEXT LE
     VEL."
1550 PEN 1:PRINT:PRINT" THE WAY IN WHICH
      YOU COLOUR THE DISCS":PRINT:PRINT"
     DEPENDS ON THE LEVEL THAT YOU ARE":
     PRINT:PRINT"PLAYING ON."
1560 GOSUB 1920
1570 CLS:PEN 2
1580 PRINT" ON EACH LEVEL THERE IS ONE T
     ELEPORT,":PRINT:PRINT"THIS CAN BE U
     SED TO GET OUT OF TROUBLE":PRINT:PR
     INT"BUT EVERY TIME YOU USE IT YOU L
     OSE":PRINT:PRINT"50 POINTS."
1590 PEN 1:PRINT:PRINT" "CHR$(199):PRINT
      CHR$(198)CHR$(159)CHR$(196):PRINT"
      "CHR$(197)
1600 PEN 3:LOCATE 6,10:PRINT"THIS IS A T
     ELEPORT."
1610 LOCATE 17,12:PEN 1:PRINT"LEVEL  1"
1620 PRINT:PEN 2:PRINT" THIS LEVEL IS TH
     E EASIEST OF THE THREE":PRINT:PRINT
     "LEVELS. EACH DISC ONLY NEEDS TO BE
     ":PRINT:PRINT"JUMPED UPON ONCE TO B
     E CHANGED TO THE":PRINT:PRINT"COLOU
     R OF THE REFERENCE DISCS,JUMPING"
```

```
1630 PRINT:PRINT"ON THEM TWICE DOES NOT
     CAUSE THEM TO":PRINT:PRINT"CHANGE B
     ACK TO THIER ORIGINAL COLOUR."
1640 GOSUB 1920
1650 CLS
1660 PEN 1:PRINT TAB(17):PRINT"LEVEL  2"
     :PEN 3
1670 PRINT:PRINT" ON THIS LEVEL YOU MUST
      CHANGE ALL THE":PRINT:PRINT"DISC B
     Y JUMPING ON THEM TWICE EACH.":PRIN
     T:PRINT"AGAIN JUMPING ON A COMPLETE
     D DISC DOES":PRINT:PRINT"NOT CHANGE
      IT BACK TO ITS ORIGINAL":PRINT:PRI
     NT"COLOUR."
```

```
1680 PEN 1:PRINT TAB(17):PRINT"LEVEL  3"
     :PEN 3
1690 PRINT:PRINT" THIS LEVEL IS THE SAME
      AS LEVEL 2":PRINT:PRINT"EXCEPT THA
     T WHEN YOU JUMP ON A COMPLETED":PRI
     NT"DISC IT TURNS BACK TO ITS ORIGIN
     AL":PRINT:PRINT"COLOUR,THIS LEVEL N
     EEDS STRATERGY AND":PRINT:PRINT"USE
      OF THE TELEPORT MAY BE NEEDED TO"
1700 PRINT:PRINT"COMPLETE THIS LEVEL."
1710 GOSUB 1920
1720 CLS:PEN 1
1730 PRINT" THERE ARE THREE WAYS OF BEIN
     G KILLED,":PRINT:PRINT"THESE ARE:-"
1740 PEN 3:PRINT:PRINT"1 :";:PEN 2:PRINT
     "TRYING TO JUMP OFF THE GRID"
1750 PEN 3:PRINT:PRINT"2 :";:PEN 2:PRINT
     "RUNNING OUT OF TIME"
1760 PEN 3:PRINT:PRINT"3 :";:PEN 2:PRINT
     "BEING SHOT BY THE X-Y ZAPPERS"
1770 PRINT:PEN 1:PRINT" THE X-Y ZAPPERS
     ARE THE SMALL RED SHIPS":PRINT"THAT
      MOVE UP & DOWN ON THE LEFT OF THE"
     :PRINT:PRINT"GRID AND LEFT & RIGHT
     ON THE TOP OF THE":PRINT:PRINT"GRID
     . THESE SOMETIMES FIRE DEATH RAYS":
     PRINT:PRINT"INTO THE GRID."
```

```
1780 GOSUB 1920
1790 PEN 1:CLS
1800 PRINT" EVERY TIME LEVEL 3 IS COMPLE
     TED A NEW":PRINT:PRINT"ROUND IS STA
     RTED, THIS MEANS THE":PRINT:PRINT"X
     -Y ZAPPERS MOVE MORE QUICKLY THAN":
     PRINT:PRINT"BEFORE AND YOU START ON
      LEVEL 1 AGAIN."
1810 PRINT:PRINT"AFTER SEVERAL ROUNDS HA
     VE BEEN COMPLETED":PRINT"HOWEVER TH
     E GAME STOPS GETTING FASTER":PRINT:
     PRINT"AND INSTEAD YOU HAVE LESS TIM
     E TO FINISH":PRINT"EACH LEVEL."
1820 GOSUB 1920
1830 CLS
1840 PEN 1:LOCATE 17,1:PRINT"CONTROLS":P
     EN 2:LOCATE 16,2:PRINT STRING$(10,2
     08)
```

```
1850 PRINT:PEN 3:PRINT"KEYBOARD:-":PEN 1
1860 PRINT:PRINT"Z = LEFT , X = RIGHT":P
     RINT:PRINT"P = UP , L= DOWN"
1870 PRINT:PRINT:PEN 3:PRINT"JOYSTICK:-"
     :PEN 1
1880 PRINT:PRINT"USE JOYSTICK 0."
1890 GOSUB 1920
1900 RETURN
1910 ' ***** WAIT FOR KEYPRESS *****
1920 FOR f=1 TO 20:k$=INKEY$:NEXT:LOCATE
      1,25:PAPER 3:PEN 2:PRINT"      PRE
     SS SPACE/FIRE TO CONTINUE      ";
1930 PAPER 0
1940 j=0
1950 WHILE k$<>" " AND j<>16:k$=INKEY$:j
     =JOY(0):WEND
1960 RETURN
1970 ' ***** PRINT GAME SCREEN *****
1980 BORDER 0:LOCATE 1,1:INK 0,0:INK 2,0
     :INK 3,0:INK 6,0:INK 7,0:INK 9,0:IN
     K 10,0:INK 11,0:INK 12,0:INK 14,0:I
     NK 15,0
1990 INK 8,7
2000 PAPER 0:PEN 8
2010 FOR f=1 TO 20:k$=INKEY$:NEXT
2020 PRINT CHR$(194)STRING$(3,154);:PEN
      1:PRINT" CRAZY LEGS ";:PEN 8:PRINT
      STRING$(3,154)CHR$(195);
2030 PRINT CHR$(149)SPC(18)CHR$(149);:PR
     INT CHR$(149);:PEN 4:PRINT"SCORE";:
     PEN 13:PRINT sc:LOCATE 14,3:PEN 4:P
     RINT"MEN";:PEN 13:PRINT men:LOCATE
     20,3:PEN 8:PRINT CHR$(149);
```

```
2040 PRINT CHR$(149);:PEN 4:PRINT"LEVEL"
     ;:PEN 13:PRINT lev:PEN 4:LOCATE 11,
     4:PRINT"TIME";:PEN 13:PRINT TIM:PEN
      8:LOCATE 20,4:PRINT CHR$(149);
2050 PRINT CHR$(193)STRING$(18,154)CHR$(
     192)
2060 d1$="":d2$="":d3$="":FOR f=1 TO 5:d
     1$=d1$+CHR$(240)+CHR$(143)+CHR$(241
     )+CHR$(32):d2$=d2$+CHR$(15)+CHR$(9)
     +STRING$(3,143)+CHR$(15)+CHR$(6)+CH
     R$(154):d3$=d3$+CHR$(242)+CHR$(143)
     +CHR$(243)+CHR$(32):NEXT
2070 d2$=LEFT$(d2$,37):d4$="":FOR f=1 TO
      5:d4$=d4$+"  "+CHR$(149)+"  ":NEXT
      f
2080 FOR f=1 TO 5:PEN 9:PRINT d1$;d2$;d3
     $;:IF f<>5 THEN PEN 6:PRINT d4$;
2090 NEXT
```

```
2100 PEN 11:LOCATE 8,14:PRINT CHR$(231):
     LOCATE 12,14:PRINT CHR$(231):LOCATE
      8,18:PRINT CHR$(231):LOCATE 12,18:
     PRINT CHR$(231)
2110 PEN 6:a=INT(RND*5)*4+1:b=INT(RND*5)
     *4+7:IF a=9 AND b=15 THEN 2110 ELSE
      LOCATE a,b:PRINT" "CHR$(199)" ":LO
     CATE a,b+1:PRINT CHR$(198)CHR$(159)
     CHR$(196):LOCATE a,b+2:PRINT" "CHR$
     (197)" "
2120 d1=disc((lev-1) MOD 3,0):d2=disc((l
     ev-1) MOD 3,1):d3=disc((lev-1) MOD
     3,2)
2130 INK 0,0:INK 1,26:INK 2,6:INK 3,2:IN
     K 4,18:INK 5,24:INK 6,15:INK 7,16:I
     NK 8,7:INK 9,d1:INK 10,d2:INK 11,d3
     :INK 12,1:INK 13,9:INK 14,13:INK 15
     ,24
2140 RETURN
```

```
2150 ' ***** LEVEL COMPLETION *****
2160 ' *****      ROUTINE     *****
2170 r=REMAIN(0):SPEED INK 10,10:INK 11,
     d3,d1:INK 6,6,2:SOUND 135,0
2180 FOR f=0 TO 640 STEP 4:MOVE f,0:DRAW
     R 0,80,0:MOVE 640-f,320:DRAWR 0,-80
     :MOVE 640-f,80:DRAWR 0,80:MOVE f,24
     0:DRAWR 0,-80:SOUND 1,f,4,15:SOUND
     2,650-f,4,15:NEXT
2190 WINDOW 1,20,6,25
2200 INK 9,2,6:SPEED INK 10,10
2210 LOCATE 6,20:PEN 9:PRINT"TIME BONUS"
     :GOSUB 2470
2220 PEN 14:FOR f=500 TO 100 STEP -100:G
     OSUB 2470:GOSUB 2470:LOCATE 5,20:PR
     INT f"POINTS":NEXT
2230 FOR f=1 TO 5:GOSUB 2470:NEXT
```

```
2240 IF tim<551 THEN h=6:bo=100:GOTO 229
     0
2250 IF tim<751 THEN h=8:bo=200:GOTO 229
     0
2260 IF tim<801 THEN h=10:bo=300:GOTO 22
     90
2270 IF tim<851 THEN h=12:bo=400:GOTO 22
     90
2280 h=14:bo=500
2290 h=h*16:TAG
2300 DRAWR 0,0,2:FOR f=0 TO h STEP 2:MOV
     E 605,f:CALL &BD19:PRINT CHR$(252);
     :MOVE 621,f-16:DRAWR 20,0,0:DRAWR 0
     ,0,2:SOUND 1,f,2,4:SOUND 2,f+30,2,4
     :NEXT
2310 TAGOFF
2320 LOCATE 1,1:PRINT CHR$(23)CHR$(1)
2330 FOR g=1 TO 180:MOVE 600,f-10:DRAWR
     -600,0,RND*15:SOUND 1,0,1,15,0,0,g/
     6:NEXT
2340 PRINT CHR$(23)CHR$(0)
2350 MOVE 600,f-10:DRAWR -600,0,0
2360 LOCATE 5,21-(h/16):INK 10,13,26:PEN
      10:PRINT bo"POINTS"
2370 SOUND 1,40,-1,15,1,3:
2380 WINDOW 1,20,1,25:PEN 13
2390 FOR f=sc TO sc+bo STEP 5:SOUND 2,(f
     -sc)/5,1,6:LOCATE 7,3:PRINT f:NEXT:
     sc=sc+bo
2400 WINDOW 1,20,6,25:FOR f=1 TO 4:GOSUB
      2470:NEXT
2410 lev=lev+1:PEN 9:LOCATE 2,20:PRINT"N
     OW ENTER LEVEL:"lev
2420 FOR f=1 TO 10:GOSUB 2470:NEXT:SOUND
      1,40,-1,15,1,3:SOUND 2,10,-1,15,1,
     3:SOUND 4,80,-1,15,1,3:FOR f=1 TO 2
     000:NEXT:WINDOW 1,20,1,25
```

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(Prod Code EU)

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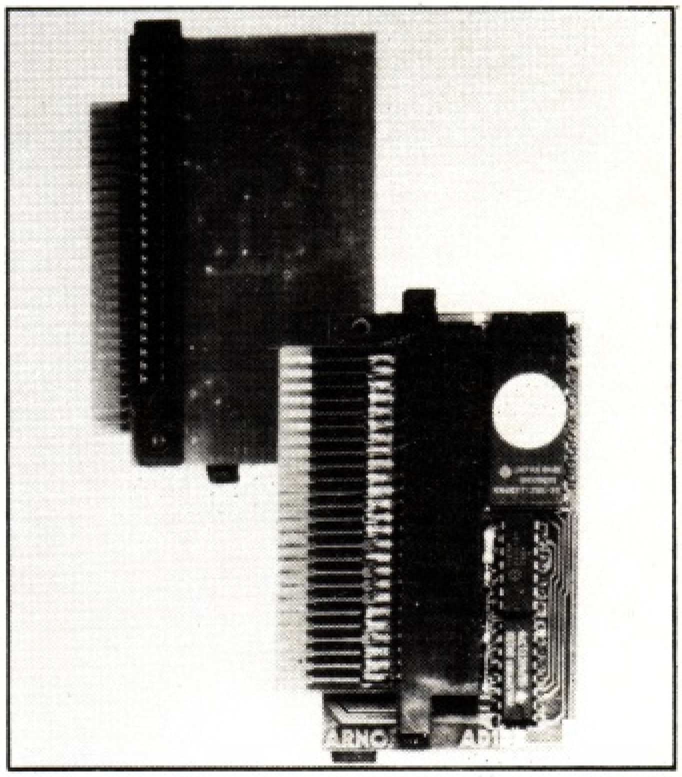
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```
2430 IF lev/4=lev\4 AND in=10 THEN stim=stim-100
2440 IF lev/4=lev\4 AND in>10 THEN in=in-10
2450 GOTO 150
2460 ' ***** SCROLL WINDOW UP *****
2470 LOCATE 1,20:PRINT CHR$(10):SOUND 4,100,5,5:RETURN
2480 ' ***** DEATH ROUTINE *****
2490 SOUND 135,100,-1,15,1,0,31:r=REMAIN(0):FOR f=1 TO 400:r=RND*7:BORDER r:INK 0,r:NEXT
2500 INK 0,0:BORDER 0
2510 l=640:h=320:x=0:y=0
2520 FOR f=1 TO 81:SOUND 1,200+f*2,1,7:SOUND 2,f,1,7:MOVE x,y:DRAWR l,0,0:DRAWR 0,h:DRAWR -l,0:DRAWR 0,-h:x=x+4:y=y+2:l=l-8:h=h-4:NEXT
2530 men=men-1:IF men>0 THEN 150
2540 ' ***** GAME OVER ROUTINE *****
2550 l=0:h=0:x=320:y=160:FOR f=1 TO 81:SOUND 1,200+f*2,1,7:SOUND 2,f,1,7:MOVE x,y:DRAWR l,0,2:DRAWR 0,h:DRAWR -l,0:DRAWR 0,-h:x=x-4:y=y-2:l=l+8:h=h+4:NEXT
```

```
2560 LOCATE 6,16:PEN 9:SPEED INK 40,40:PAPER 2:PRINT"GAME  OVER"
2570 FOR g=31 TO 0 STEP -1:INK 9,f MOD 26:FOR f=0 TO g:SOUND 1,f,1,7:SOUND 2,f*g,1,7,0,0:NEXT f,g
2580 PAPER 0:CLS:INK 5,6,2:INK 15,2,6
2590 nhs=0:FOR f=0 TO 4:IF sc<hi(f) THEN NEXT:nhs=1:GOTO 2630
2600 IF f=0 THEN a=1 ELSE a=f
2610 FOR g=4 TO a STEP -1:hi(g)=hi(g-1):hi$(g)=hi$(g-1):NEXT g
2620 hi(f)=sc:hi$(f)="----------"
2630 PEN 9:LOCATE 5,2:PRINT"HIGH  SCORES"
2640 FOR g=0 TO 4:LOCATE 1,g+4:PEN 8:PRINT g+1:LOCATE 3,g+4:PRINT":";:PEN 4:PRINT hi$(g):LOCATE 14,g+4:PEN 3:PRINT hi(g):NEXT g
2650 MOVE 12,393:DRAWR 615,0,5:DRAWR 0,-130:DRAWR -615,0:DRAWR 0,130:MOVE 16,391:DRAWR 607,0,15:DRAWR 0,-126:DRAWR -607,0:DRAWR 0,126
2660 IF nhs THEN FOR f=1 TO 8:LOCATE 1,1:PRINT CHR$(11):NEXT f:en=1:t1=0:t2=0:EVERY 10 GOSUB 2940:GOTO 2890
2670 PEN 6:LOCATE 2,11:PRINT"USE ";CHR$(255);" & FIRE/SPACE":LOCATE 4,12:PRINT"TO ENTER NAME:"
2680 a$="ABCDEFGHIJKLMNOPQRSTUVWXYZ.,* "
2690 PEN 14:LOCATE 3,15:PRINT"A B C D E F G H":LOCATE 3,17:PRINT"I J K L M N O P":LOCATE 3,19:PRINT"Q R S T U V W X":LOCATE 3,21:PRINT"Y Z . , * "CHR$(1)CHR$(8)" "CHR$(1)CHR$(13)
2700 LOCATE 3,24:PRINT CHR$(1)CHR$(13);:PEN 13:PRINT"=ENTER ";:PEN 14:PRINT CHR$(1)CHR$(8);:PEN 13:PRINT"=DELETE"
```

```
2710 FOR g=1 TO 20:k$=INKEY$:NEXT
2720 LOCATE 4,f+4:INK 11,20,1:PEN 11:PRINT hi$(f);hi(f)
2730 le=1:x=48:y=182:na$=""
2740 MOVE x,y:DRAWR 56,0,1:DRAWR 0,-28:DRAWR -56,0:DRAWR 0,28
2750 t1=0:t2=0:en=1:EVERY 10 GOSUB 2940
```

```
2760 k$=INKEY$:j=JOY(0)
2770 IF k$<>" " AND k$<>"z" AND k$<>"x" AND j<>4 AND j<>8 AND j<>16 THEN 2760
2780 MOVE x,y:DRAWR 56,0,0:DRAWR 0,-28:DRAWR -56,0:DRAWR 0,28
2790 IF (k$=" " OR j=16) AND le=31 AND na$<>"" THEN na$=LEFT$(na$,LEN(na$)-1):LOCATE 4,f+4:PRINT na$;"-":WHILE k$=" " OR j<>0:k$=INKEY$:j=JOY(0):WEND
2800 IF (k$=" " OR j=16) AND le=32 THEN 2850
2810 IF k$="x" OR j=8 THEN x=x+64:le=le+1:IF x=560 THEN x=48:y=y-32:IF y=54 THEN x=48:y=182:le=1
2820 IF k$="z" OR j=4 THEN x=x-64:le=le-1:IF x=-16 THEN x=496:y=y+32:IF y=214 THEN x=496:y=86:le=32
2830 IF k$=" " OR j=16 AND le<31 THEN na$=na$+MID$(a$,le,1):LOCATE 4,f+4:PRINT na$:WHILE k$=" " OR j<>0:k$=INKEY$:j=JOY(0):WEND:IF LEN(na$)>9 THEN 2850
2840 MOVE x,y:DRAWR 56,0,1:DRAWR 0,-28:DRAWR -56,0:DRAWR 0,28:GOTO 2760
2850 WINDOW 1,20,10,25:CLS:WINDOW 1,20,1,25:FOR g=1 TO 20:k$=INKEY$:NEXT
2860 LOCATE 4,f+4:PRINT"          ":hi$(f)=na$
```

```
2870 PEN 4:LOCATE 4,f+4:PRINT na$:LOCATE 14,f+4:PEN 3:PRINT sc:FOR f=1 TO 8:LOCATE 1,1:PRINT CHR$(11):NEXT
2880 FOR f=1 TO 5000:NEXT
2890 LOCATE 1,25:PAPER 13:PEN 9:PRINT" PRESS SPACE/FIRE  ";
2900 IF INKEY$<>" " AND JOY(0)<>16 THEN 2900
2910 re=REMAIN(0):SOUND 135,0:GOTO 110
2920 ' ***** TUNE 2 INTERRUPT *****
2930 ' *****    SUBROUTINE    *****
2940 IF t2=29 THEN en=4
2950 IF NOT SQ(1) AND 2 THEN SOUND 1,p1(t1,0,0),p1(t1,1,0),15,en:t1=t1+1
2960 IF NOT SQ(4) AND 2 THEN SOUND 4,p1(t2,0,1),p1(t2,1,1),15,en:t2=t2+1:IF t2=56 THEN t1=0:t2=0:en=1
2970 RETURN
2980 ' ***** READ TUNE DATA *****
2990 MODE 1:BORDER 0:INK 0,0:PAPER 0:CLS:INK 1,4,17:SPEED INK 15,15:LOCATE 15,12:PEN 1:PRINT"PLEASE  WAIT"
3000 DIM t1(105,1,2),nn(4),hi$(4),hi(4):RESTORE 3270:cr=40:nn(0)=83:nn(1)=104:hi$(0)=" * MITCH *":hi$(1)="FODSLAP":hi$(2)="ARNOLD":hi$(3)="CLUMSY":hi$(4)="FAG ASH":FOR f=0 TO 4:hi(f)=(5-f)*100:NEXT
```

```
3010 FOR n=0 TO 1
3020 FOR f=0 TO nn(n):READ t1(f,0,n),dur$
3030 IF dur$="q"THEN dur=cr/2
3040 IF dur$="c"THEN dur=cr
3050 IF dur$="dc"THEN dur=cr+cr/2
3060 IF dur$="m"THEN dur=cr*2
3070 IF dur$="s"THEN dur=cr*4
3080 t1(f,1,n)=dur
3090 NEXT f,n
3100 DIM p1(56,1,1)
3110 FOR f=0 TO 53:READ p1(f,0,0),dur$
3120 IF dur$="q"THEN dur=20
3130 IF dur$="c"THEN dur=40
```

```
3140 IF dur$="dc"THEN dur=60
3150 IF dur$="m"THEN dur=80
3160 IF dur$="dm"THEN dur=160
3170 p1(f,1,0)=dur:NEXT f
3180 FOR f=0 TO 55:READ p1(f,0,1),dur$
3190 IF dur$="q"THEN dur=20
3200 IF dur$="c"THEN dur=40
3210 IF dur$="dc"THEN dur=60
3220 IF dur$="m"THEN dur=80
3230 IF dur$="dm"THEN dur=160
3240 p1(f,1,1)=dur:NEXT f
```

```
3250 RETURN
3260 ' ***** DATA FOR TUNE 1 *****
3270 DATA 284,m,319,q,358,q,284,q,319,q,358,c,179,c,213,q,179,dc,239,m,284,c,358,c,319,s,284,m,319,q,358,q,284,q,319,q,358,c,179,c,213,q,179,dc,239,c,284,q,358,q,319,c,319,c,358,s
3280 DATA 284,m,319,q,358,q,284,q,319,q,358,c,179,c,213,q,179,dc,239,m,284,c,358,c,319,s,284,m,319,q,358,q,284,q,319,q,358,c,179,c,213,q,179,dc,239,c,284,q,358,q,319,c,319,c,358,s
3290 DATA 190,dc,179,q,159,c,239,c,239,dc,213,q,239,c,179,c,179,c,213,c,253,c,213,c,239,s,284,m,319,q,358,q,284,q,319,q,358,c,179,c,213,q,179,dc,239,c,284,q,358,q,319,c,319,c,358,s
3300 DATA 716,m,478,c,379,c,358,c,568,c,536,q,426,dc,716,m,478,c,568,c,478,q,536,q,478,q,379,q,239,q,253,q,284,q,319,q,358,c,478,c,536,q,568,q,568,c,568,c,426,c,506,m,478,c,478,q,568,q,536,c,536,c,568,q,716,q,568,q,478,q,358,q,568,q,478,q,358,q
3310 DATA 716,m,478,c,379,c,358,c,568,c,536,q,426,dc,716,m,478,c,568,c,478,q,536,q,478,q,379,q,239,q,253,q,284,q,319,q,358,c,478,c,536,q,568,q,568,c,568,c,426,c,506,m,478,c,478,q,568,q,536,c,536,c,568,q,716,q,568,q,478,q,358,q,568,q,478,q,358,q
```

```
3320 DATA 319,dc,319,q,319,c,379,c,358,dc,358,q,358,c,358,c,358,c,358,c,426,c,358,c,379,s,358,c,478,c,536,q,568,q,568,c,568,c,426,c,506,m,478,c,478,q,568,q,536,c,536,c,568,s
3330 ' ***** DATA FOR TUNE 2 *****
3340 DATA 319,q,284,q,253,dc,239,q,239,c,213,c,213,m,253,c,213,c,239,dc,253,q,239,c,284,c,253,dm
3350 DATA 319,q,284,q,253,dc,239,q,239,c,213,c,213,m,253,c,213,c,239,dc,253,q,239,c,284,c,319,dm
3360 DATA 213,c,159,dc,169,c,190,c,213,c,213,m,253,c,213,c,239,dc,253,q,239,c,284,c,253,dm,213,c,159,dc,169,c,190,c,213,c,213,m,253,c,213,c,239,dc,253,q,239,c,284,c,319,dm
3370 DATA 506,q,426,q,319,dc,284,q,284,c,253,c,253,m,319,c,253,c,284,dc,319,q,284,c,338,c,319,dm
3380 DATA 506,q,426,q,319,dc,284,q,284,c,253,c,253,m,319,c,253,c,284,dc,319,q,284,c,426,q,478,q,506,dm
3390 DATA 253,c,253,dc,213,c,239,c,253,c,253,m,319,c,253,c,284,dc,319,q,284,c,338,c,319,dm,253,c,253,dc,213,c,239,c,253,c,253,m,319,c,253,c,284,dc,319,q,284,c,426,q,478,q,506,dm
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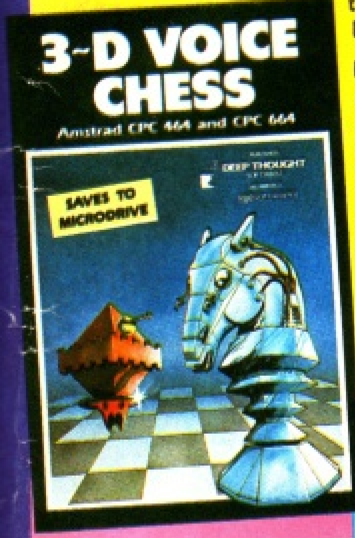
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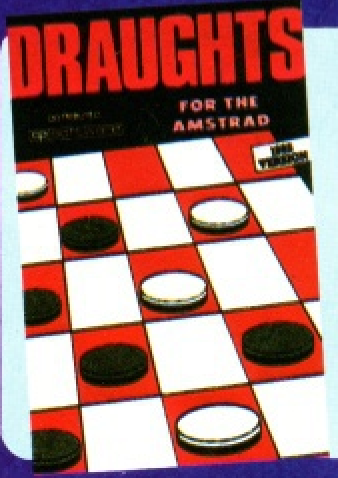
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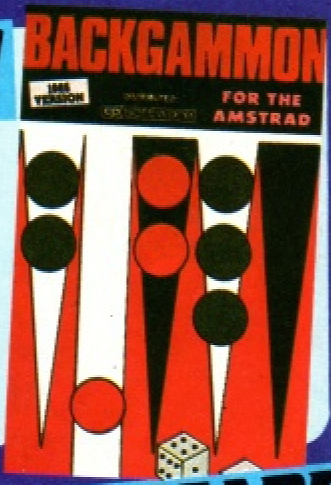
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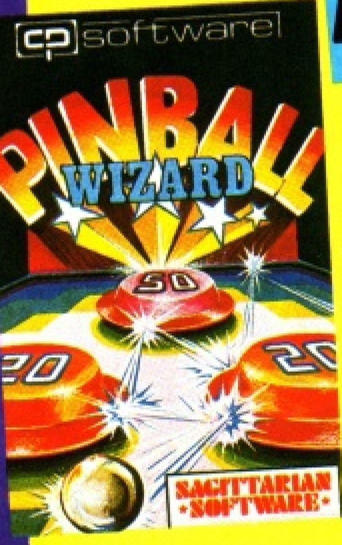
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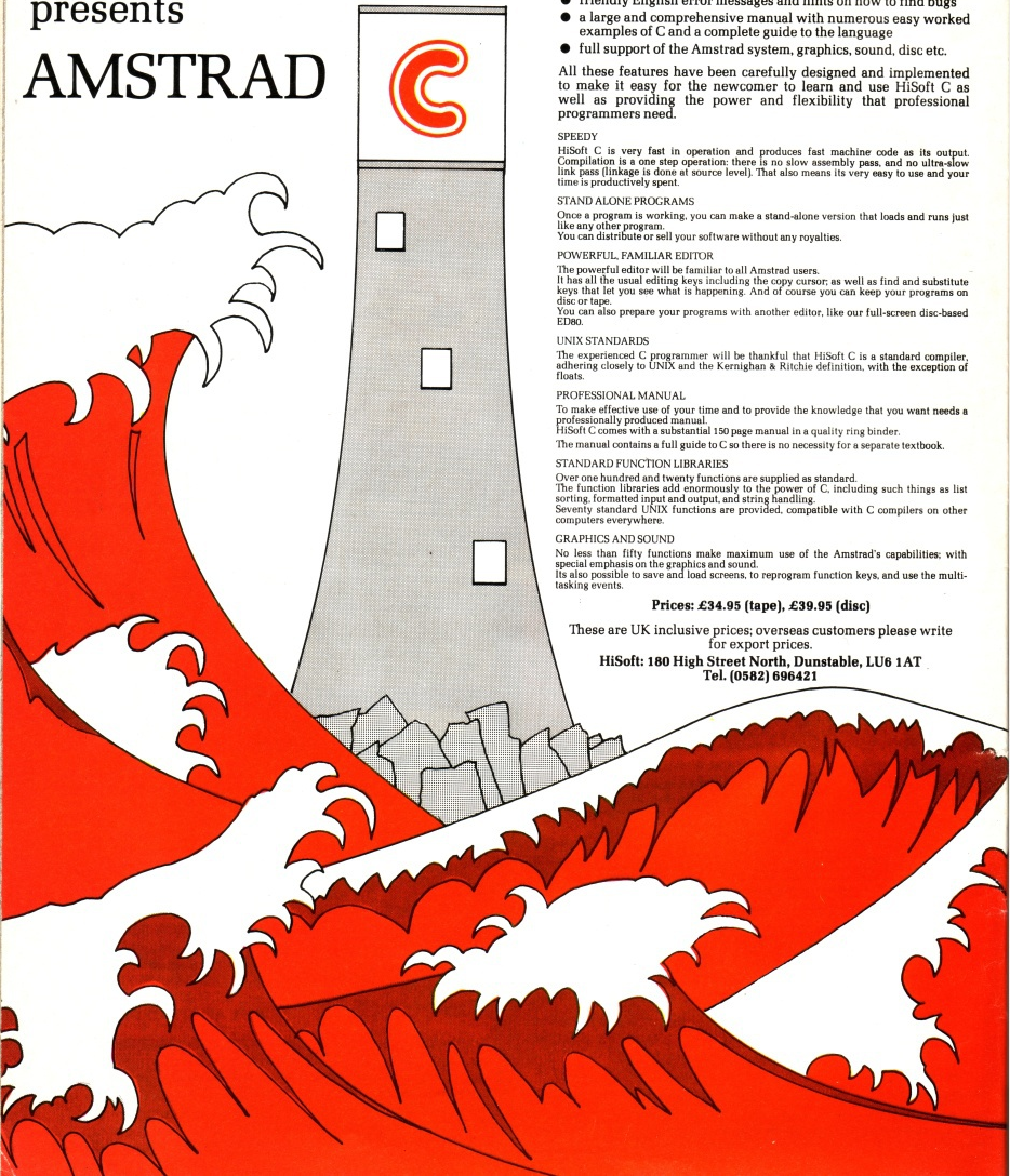
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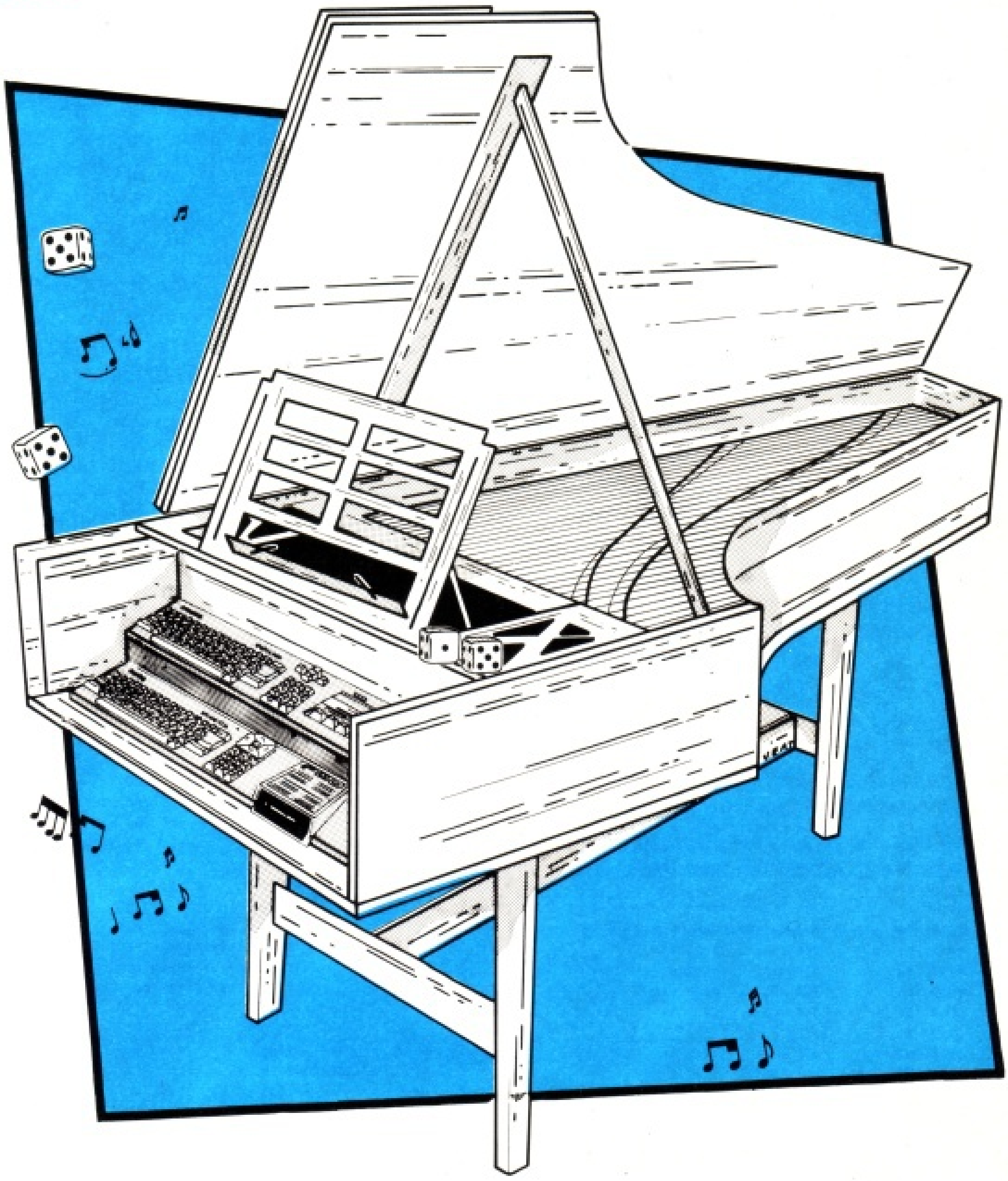
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MACHINE CODE MOZART

Part 2 (of 3) by Richard Sargent

Last month we got the machine code mozart program running, now it is time to see how it works.



The code

The machine code is self-contained, and needs only the bare minimum of support from BASIC. CALL &6900 will play 60 seconds of Mozart and

```
10 CALL &6900:GOTO 10
```

will play Mozart for ever. BREAK will still work, since interrupts are not disabled 100% of the time. The source code for the driving program consists of a few modules and there are one or two areas where modification can be made.

BARTAB: from &5DCA to &6780. These bytes are the notes from Mozart's Dice Waltz manuscripts and shouldn't be changed (unless you wish to rewrite his word). The lowest number in the table is 00, a musical rest, and the highest is &33 (note value 51).

NTAB1: at &6782. Mozart's work uses a range of 51 notes. The note value, taken from BARTAB, is used as a pointer to extract a double-byte from NTAB1 and the double-byte is loaded into the PSG sound channel. There are two of these tables; NTAB2 simply has the 51 notes set to a different musical key in order to give variety to the music when it is played endlessly. The key of either table can be changed by a short BASIC routine.

LOOKUP: At &6850. this is the computer's version of Mozart's 11 row, 16 column table. It should not be changed.

TEMPO: At &6917. This byte governs the tempo of the music, and should range from &80 to &FF. POKE &6917,195 sets the "proper" speed of play.

RNDTAB and PRETAB are assembly points for the 16 separate bars.

AUTO: &6944 to &6977. Throws the dice and assembles 16 bars from the LOOKUP table of 171 bars.

PRESET: From &6978 to the end. Plays the minuet according to Mozart's rules, using 16 bars (288 bytes) in BARTAB, which are pointed to by the information in RNDTAB.

The machine-code program doesn't attempt to handle the screen in any meaningful way. When testing the program, I found it useful to see the 16 random numbers generated for each tune (they are nicely random, incidentally), and also to see the progress of the music as a succession of dots on the screen. The code for all this is at the following locations, and can be blanked out by five &00 bytes (NOPs) at each location.

```
&6969 0,0,0,0,0
&6A03 0,0,0,0,0
&6A0D 0,0,0,0,0
&6A22 0,0,0,0,0
```

Running the Program

Because of the length of machine code involved, a cassette tape of the program is available. Mozart, fortunately, will not be requiring royalties on his work. The code was originally loaded using the HISOFT ASSEMBLER. Don't forget to use MEMORY &5C00 to protect the machine code. The main purpose of the BASIC program is to preserve any minuet which you may want to hear again. After the music has finished. RNDTAB holds the relevant information which can be PEEKED and thus saved. To replay that



information, it must be POKED into PRETAB and the program started with CALL &6902 (not &6900). It is left to you to develop this aspect of the program, and also the key-changing facilities, from the outlines given in the BASIC program shown. Keys A and B probably sound best.

```
6900                   ORG  #6900
6900                   ENT  #6900

5DCA        BARTAB:    EQU  #5DCA
6782        NTAB1:     EQU  #6782
67EA        NTAB2:     EQU  #67EA
6850        LOOKUP:    EQU  #6850
BD34        MCSR:      EQU  #BD34

6900 1842              JR   AUTO
6902 112469            LD   DE,RNDTAB
6905 213469            LD   HL,PRETAB
6908 011000            LD   BC,16
690B EDB0              LDIR
690D FD211369          LD   IY,FLAG1
6911 1865              JR   PRESET
6913 00     FLAG1:     DEFB 0
6914 40     C1:        DEFB #40
6915 20     C2:        DEFB #20
6916 80     C3:        DEFB #80
6917 C3     TEMPO:     DEFB 195
6918 00     OFFSET:    DEFB 0
6919 14     C4:        DEFB #14
691A 00     REG:       DEFB 0
691B AA     RSEED:     DEFB #AA
691C 0E     VOL:       DEFB 14
691D 01                DEFB 1
691E 02                DEFB 2
691F 00     ENVF:      DEFB 0
6920 0D     ENVC:      DEFB #0D
6921 08     ENVS:      DEFB #08
6922 0000   COUNT:     DEFB 0,0
6924 00000000 RNDTAB:  DEFB 0,0,0,0,0,0,0,0
692C 00000000          DEFB 0,0,0,0,0,0,0,0
6934 273E812E PRETAB:  DEFB 39,62,129,46,126,103,95,29
693C 17620782          DEFB 23,98,7,130,53,17,22,70
6944 FD211369 AUTO:    LD   IY,FLAG1
6948 214568            LD   HL,LOOKUP-11
694B DD212369          LD   IX,RNDTAB-1
694F 0610              LD   B,16
6951 110B00 PRIME:     LD   DE,11
6954 19                ADD  HL,DE
6955 ED5F   RND:       LD   A,R
6957 FD5608            LD   D,(IY+8)
695A 82                ADD  A,D
695B 57                LD   D,A
695C FD7208            LD   (IY+8),D
695F E60F              AND  #0F
6961 FE0B              CP   11
6963 30F0              JR   NC,RND
6965 E5                PUSH HL
6966 1600              LD   D,0
6968 5F                LD   E,A

6969 C630              ADD  A,#30
696B CD5ABB            CALL #BB5A


696E 19                ADD  HL,DE
696F 7E                LD   A,(HL)
6970 E1                POP  HL
6971 DD23              INC  IX
6973 DD7700            LD   (IX+0),A
6976 10D9              DJNZ PRIME

6978 3E05   PRESET:    LD   A,5
697A F5     L1:        PUSH AF
697B 0E00              LD   C,0
697D CD34BD            CALL MCSR
6980 F1                POP  AF
6981 3D                DEC  A
6982 FEFF              CP   #FF
6984 20F4              JR   NZ,L1
6986 3E07              LD   A,7
6988 0E38              LD   C,#38
698A CD34BD            CALL MCSR

698D FD3400            INC  (IY+0)

6990 3E08              LD   A,8
6992 FD4E09 L20:       LD   C,(IY+9)
6995 F5                PUSH AF
6996 CD34BD            CALL MCSR
6999 F1                POP  AF
699A 3C                INC  A
699B FE0B              CP   11
699D 20F3              JR   NZ,L20


699F F3                DI


69A0 FD460B PLAY:      LD   B,(IY+11)
            ;THERE ARE 2 PARTS
69A3 C5                PUSH BC

69A4 C5     PART:      PUSH BC
69A5 0608              LD   B,8
            ;THERE ARE 8 BARS
69A7 212469            LD   HL,RNDTAB
69AA FD5E05            LD   E,(IY+5)
69AD 1600              LD   D,0
69AF 19                ADD  HL,DE
69B0 EB                EX   DE,HL

69B1 C5     BARS:      PUSH BC
69B2 1A                LD   A,(DE)
69B3 13                INC  DE
69B4 D5                PUSH DE
69B5 47                LD   B,A
69B6 210000            LD   HL,0
69B9 111200            LD   DE,#12
69BC 19     L2:        ADD  HL,DE
69BF 01B85D            LD   BC,BARTAB-#12
69C2 00                NOP
69C3 09                ADD  HL,BC

69C4 0606              LD   B,6
            ;THERE ARE 6 PERIODS
69C6 C5     PERIOD:    PUSH BC
            ;PLAY A PERIOD


69C7 AF                XOR  A
69C8 321A69 L10:       LD   (REG),A
69CB AF                XOR  A
69CC BE                CP   (HL)
69CD 2006              JR   NZ,L11
69CF CD476A            CALL SOUND
69D2 AF                XOR  A
69D3 1819              JR   L13

69D5 46     L11:       LD   B,(HL)
69D6 FDCB0046          BIT  0,(IY+0)
69DA 2805              JR   Z,OPT2
69DC 118067            LD   DE,NTAB1-2
69DF 1803              JR   L14
69E1 11E867 OPT2:      LD   DE,NTAB2-2
69E4 13     L14:       INC  DE
69E5 13                INC  DE
69E6 10FC              DJNZ L14
69E8 1A                LD   A,(DE)
69E9 13                INC  DE
69EA CD476A            CALL SOUND
69ED 1A                LD   A,(DE)
69EE CD476A L13:       CALL SOUND

69F1 23                INC  HL
69F2 3A1A69            LD   A,(REG)
69F5 FE06              CP   6
69F7 38CF              JR   C,L10

            ;TIMING
69F9 FD4604            LD   B,(IY+4)
69FC 0E00   L3:        LD   C,0
69FE 0D     L4:        DEC  C
69FF 20FD              JR   NZ,L4
6A01 10F9              DJNZ L3

6A03 3E2E              LD   A,#2E
6A05 CD5ABB            CALL #BB5A


6A08 C1                POP  BC
6A09 05                DEC  B
6A0A C2C669            JP   NZ,PERIOD

6A0D 3E42              LD   A,#42
6A0F CD5ABB            CALL #BB5A

            1810A12  D1       1820        POP  DE
6A13 C1                POP  BC
6A14 05                DEC  B
6A15 C2B169            JP   NZ,BARS

            ;TIMING
6A18 FD4606            LD   B,(IY+6)
6A1B 0E00   L5:        LD   C,0
6A1D 0D     L6:        DEC  C
6A1E 20FD              JR   NZ,L6
6A20 10F9              DJNZ L5

6A22 3E50              LD   A,#50
6A24 CD5ABB            CALL #BB5A


6A27 C1                POP  BC
6A28 05                DEC  B
6A29 C2A469            JP   NZ,PART

6A2C FD360508          LD   (IY+5),8
6A30 C1                POP  BC
6A31 1006              DJNZ CORR
6A33 FD360500          LD   (IY+5),0
6A37 1805              JR   CONT

6A39 C5     CORR:      PUSH BC
6A3A 04                INC  B
6A3B C3A469            JP   PART

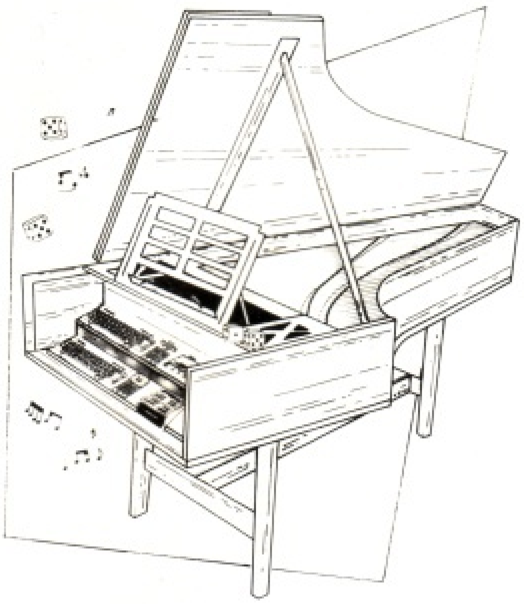
6A3E 3E07   CONT:      LD   A,7
6A40 0E3F              LD   C,#3F
6A42 CD34BD            CALL #BD34
6A45 FB                EI
6A46 C9                RET

6A47 C5     SOUND:     PUSH BC
6A48 4F                LD   C,A
6A49 3A1A69            LD   A,(REG)
6A4C CD34BD            CALL #BD34
6A4F F3                DI
6A50 FD3407            INC  (IY+7)
6A53 C1                POP  BC
6A54 C9                RET

6A55                   END
```

There are 14 registers in the AY-3-8912 Programmable Sound Generator (PSG) which the machine-code programmer is allowed to access via the special call MC SOUND REGISTER. The fifteenth register has nothing to do with sound - it is an input port which reads the state of the computer keyboard. Changing the direction of data flow at this port is possible and while no harm will be done to the electronics, it will invariably lock-up the computer to an extent where switching off the power is the only way to achieve a RESET.

Altering the contents of any other register changes the sound which comes from the three audio-channels that the AY-3-8912 possesses. These channels are reasonably isolated from each other, although the CPC electronics does mix them together to provide the stereo sound facility and also the mono capability of the built-in speaker. Each channel has its own sound source, which, so far as the programmer is



concerned, is a register-pair holding a 12-bit number. The higher the number, the lower the sound. This may seem strange, but the pitch of the note to be produced is specified by the period of the note (counted in "ticks" of 8 micro-seconds) and so the frequency-to-period relationship is given by the formula.

```
TONE PERIOD=125000/FREQUENCY
```

The CPC manuals also provide tables which explain the relationship between musical notes, their frequency and their PERIOD NUMBER (which is the number which needs to be loaded into the 12-bit register to produce the required frequency). The period number is held rather awkwardly with the four most significant (coarse-tune) bits in the higher register and the 8 least significant (fine-tune) in the lower register.

A fourth sound source is also available. This is the random-noise generator. The noise (best described as an un-ending hissing sound) is controlled by its own 5-bit register, but it has no channel of its own - it can be switched into one, two or three of the audio-channels, where it merges with whatever tone is currently going through that channel. Noise is important (you cannot do explosions without it) but is more difficult to handle than the more straightforward tones. Whether noise or tones appear on a channel depends on the setting of six soft-switches lurking in register seven of the PSG. A zero turns the switch ON. Bit 6 should remain zero at all times to maintain the keyboard-reading port as an INPUT port (see figure 1). Armed with this information, it is time to make the PSG work, and there is a test-bed program written in BASIC which allows each register to be loaded by a couple of simple keystrokes while the sounds (beautiful and otherwise) are analysed.

Test-Bed program

A small machine-code routine is needed to link the MC SOUND REGISTER routine to BASIC, and this should be studied first (see Listing 1). A copy of the PSG's registers is set up at label REG and it is here that BASIC sends any information that it wants placed in the PSG. A CALL to &8000 invokes the routine ALLREG which simply sends the 14 pieces of data in REG to the 14 registers of the PSG. A smaller quite separate routine called ONEREG is responsible for sending just one piece of data to one specified PSG register and we will see how it works later. There is no need to type in the machine-code since it is held in the BASIC program, and will be created every time the program is RUN.

The main task of the BASIC program is to produce a screen display similar to figure 2. The list of PSG registers occupies a CPC WINDOW, and will remain in view at all times. A second window beneath the register-display accepts the user's input. The input should be a single or double-digit hex number, but it need not (and indeed should not) be preceded by the "&" sign. The right-hand portion of screen is reserved as the current window, so you can, for example, BREAK out of the test-bed routine and amend the listing when it appears on the screen. The register-list stays where it is as a reminder of which register does what.

Listing 1

```
10              ORG     #8000
20              ENT     #8000
30
40 REG:         EQU     #8028
50
60 ALLREG:      LD      IX,REG-1
70              XOR     A
80 L1:          INC     IX
90              LD      C,(IX+0)
100             PUSH    AF
110             CALL #BD34
120             POP     AF
130             INC     A
140             CP      14
150             JR      NZ,L1
160             RET
170 ;
180 ONEREG:     LD      A,(IX+2)
190             LD      C,(IX+0)
200             CALL    #BD34
210             RET
220             END
```

Continuous Sound

RUNning the test-bed program sets all PSG registers to zero, with the exception of register 7 (set for TONES, not NOISE) and register 8 (set to give channel A full volume). To hear a sound, it is only necessary to load channel A's period-register with a value. Loading register 1 with the value 10 will do. The PSG has now been set into its simplest form of operation - the sounding of a continuous tone. It will sound until one of three possible actions is performed. Either the period registers 0 and 1 can be loaded 00 (a zero-period count cannot form a sound wave), or, lastly, channel A can be switched of by loading register 7 with the value 3F. The contents of registers 0-5 and 8-A should now be changed at will to see what happens, but the value loaded into R8,R9 and RA should be kept between 00 and 0F for the moment.

Envelopes

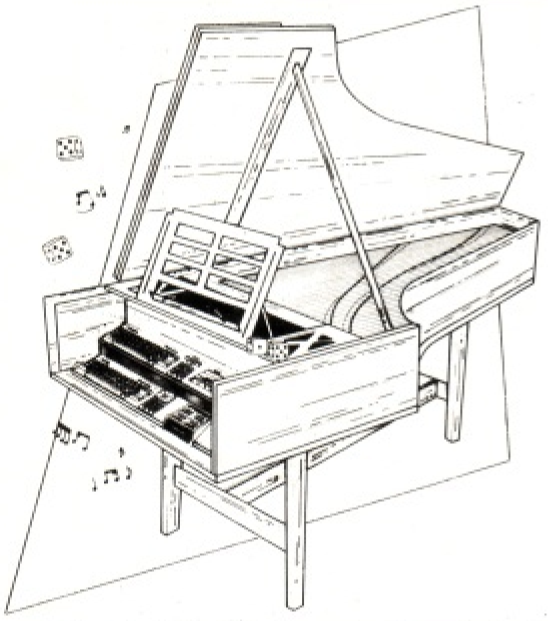
Sound from the PSG can be given an AMPLITUDE ENVELOPE so that its volume changes over a period of time. Figure 3 shows the general form of the envelope, which is quite a simple affair when compared with the facilities offered by Locomotive Basic's ENV command. To engage the PSG envelope facility for a particular channel, the relevant amplitude register (8,9 or A) should be loaded with the value 10, and until this is done, loading the envelope registers B,C and D has no effect on sound production, even if an amplitude register is set at full volume (0F).

Registers B and C hold the 12-bit period-value number in the usual style -the four most significant (fine) in the lower register. The larger the number in these registers, the broader the base of the graph in figure 3. The shape of the envelope is determined by the code in register D. Code 0F produces the shape shown in figure 3, a typical "percussion" envelope, such as might be produced by striking a bell. The values shown in figure 2 are bell-sounds, although the code in register D is not 0F. The code 08 is given, which means, in effect "repeat the bell sounds". Enter the values shown, and try changing the contents of registers C,1,3, and 5 while the sound is in progress.

The Envelope Set

There are really only two shapes of envelope available, the DECAY shape, exhibited by figure 3, and the ATTACK shape which is shown in figure 4. If you have read your CPC BASIC manual you will recognise these new words. Figure 3 produces a sound which spends all its time decaying, while figure 4 produces a sound intent on building up (attacking). Further sound shape can be built using these two as building blocks, and figure 5 shows the full set available. Codes 08-0B produce sounds which are all based on the DECAY shape while the sounds produced by codes 0C-0F are based on the ATTACK shape. Code 0B is of little value, whilst codes 0A and 0E sound the same.

The repeating sound of codes 08,0A,0C and 0E are particularly interesting. If the envelope period is taken to a low value, the envelope itself lasts only



a short while and the rate of repeat is in consequence fast enough to form a low-frequency sound of its own: another area for worthwhile experiment.

All envelope-sounds must be triggered in order to sound and this of course means that the non-repeating envelopes must be deliberately triggered every time their sound is required. The trigger is merely the action of loading register D with the desired code-number, but it represents one more insturction that the controlling micro has to perform. The Mozart program did not use the envelope facility of the PSG and so was saved that particular task. In the test-bed program the repsonse "S" to the prompt "Register ?" will usually cause the PSG to sound either continously if an amplitude register has a value of 01-0F, or give a single or multiple envelope sound if an amplitude register has a value of 10.

If you've tried "bells" on the test-bed, how about a gun-shot? This uses the non-repeating envelope, and also introduces the NOISE register.

Noise Effects

The sequence for the gunshot is:

```
RUN the program (resets registers).

Reg 6, value 0F (some noise)
Reg 7, value 38 (hear it on CH.A)
Reg C, value 0F (envelope period)
Reg D, value 09 (envelope shape)
Reg 8, value 10 (set envelope mode)
Reg S, (another gunshot)
```

If you load the registers in the order given, you will hear constant noise until you hve set up register 8. It is at this keystroke that the envelope mode is actually set, and, because all registers are reloaded every time a value byte is entered from the keyboard, the trigger register (D) is activated at this time also.

```
CALL &8015
```

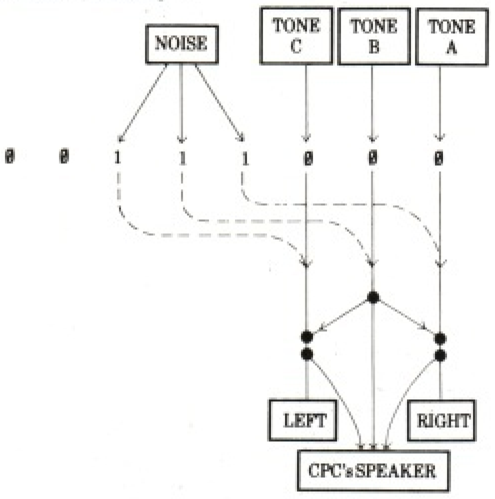
A call to this short piece of machine-code sets just one PSG register. To continue experimenting from BASIC would be convenient: it does not do to hammer away at machine code all the time. The machine code at label ONEREG takes its values from BASIC using the IX pointer method in proper Locomotive style. Therefore the BASIC command for loading the PSG is:

```
CALL &8015,R,V
```

where R is the register number and V is the value to be loaded. The "&8015" is shortened to S to make the command shorter.

Figure 1

Register 7 routes the signals: in this example the tones, but not the noise, can pass through.



Testing Tone Envelopes

BASIC listing two test the effects of different envelope shapes upon musical notes. The required machine-code is contained in the DATA statement in line 1080 and it is the same as that used in the testbed program. The PSG is correctly set by the code in lines 1090 and 1100. The notes of the tune are contained in the table at the end of the listing: they are "note-numbers" in the style of the Mozart program, but they are supplied in groups of two, not three, since only two channels of the PSG are required to sound at the same time. An array J(n) is used to translate the note-numbers into the period-value required by the PSG's tone-period registers. (The actual period-values can be seen in the DATA statements of lines 1130-1170.) The music is read in the FOR-NEXT loop of lines 1190-1250, but of course the familiar SOUND statement (or statements) is missing because machine-code is being used. On each pass through the loop, a note pair, A and B, is read, but four values must be supplied to the PSG - the fine and coarse values for each channel. Line 1200 shows the maths required to extract a Note-A-Coarse (NAC) and Note-A-Fine (NAF) from the period value contained in J(N). Line 1210 does the same for note B, and line 1220 loads the machine produced into the PSG. Line 1230 triggers the envelope sound, and line 1240 introduces the TEMPO delay (the equivalent of the SOUND command's DURATION parameter).

RUN this program and you will be driving the PSG chip quite unaided by Locomotive BASIC. Five initial values must be supplied to start the tune, and to begin with it is easier to try pure tones rather than envelope-tones. Enter:

```
15,300,0,0,0
```

in response to the five inputs-prompts.

A pleasant envelope-tone is the following:

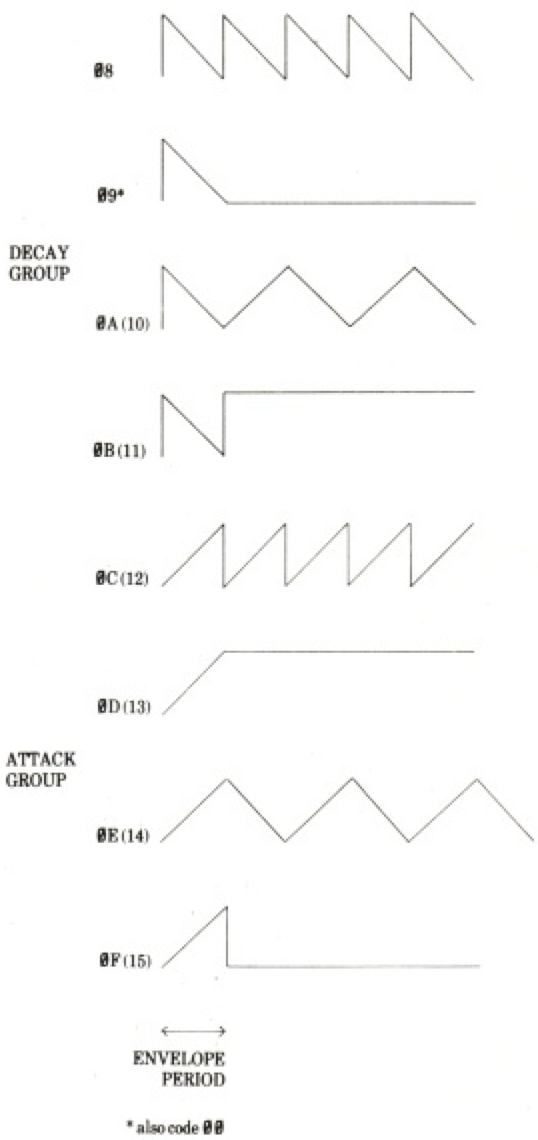
```
16,300,14,0,&B0
```

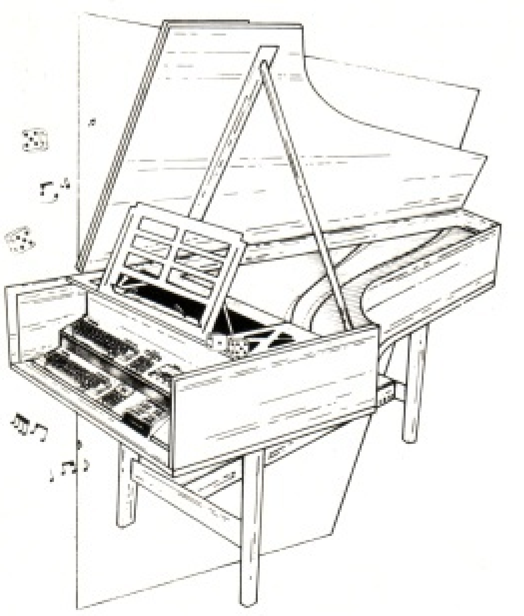
Now try changing just the last value by typing GOTO 1050.

With some envelopes, there will be some hissing or "beating" apparent on the CPC loudspeaker. The PSG designers could not completely prevent the noise of the envelope-generator leaking onto the audio channels, but if you play the output through a Hi-Fi and adjust the treble controls, you will find that this filters away the unwanted noise.

Next month, the machine code bytes return in modest force to display notes on the screen as they are played, and there is more too on random-tune generation.

THE ENVELOPE SET





Listing 2

```
1000 CLS:DIM J(66)
1010 INPUT "16 FOR ENVELOPE, OR <16 FOR
     VOLUME ";V
1020 INPUT "TEMPO (LOW IS FAST) eg 300 "
     ;T
1030 INPUT "SHAPE 8 to 16 ";SHP
1040 INPUT "ENVELOPE PERIOD COARSE eg 0
     ";EPC
1050 INPUT "ENVELOPE PERIOD FINE 2 - &FF
      eg &B0 ";EPF
1060 CLS:S=&8015:MEMORY &7FFF:RESTORE 10
     80
1070 FOR A=&8015 TO &801E:READ V$:POKE A
     ,VAL("&"+V$):NEXT
1080 DATA DD,7E,02,DD,4E,00,CD,34,BD,C9
1090 CALL S,8,V:CALL S,9,0:CALL S,&A,v:C
     ALL S,7,&38
1100 CALL S,&B,EPF:CALL S,&C,EPC
1110 RESTORE 1130
1120 FOR N=0 TO 63:READ J(N):NEXT
1130 DATA 0,1136,1073,1012,956,902,851,8
     04,758,716,676,638,602,568
1140 DATA 536,506,478,451,426,402,379,35
     8,338,319,301,284,268
1150 DATA 253,239,225,213,201,190,179,16
     9,159,150,142,134,127
1160 DATA 119,113,106,100,95,89,84,80,75
     ,71,67,63,60,56,53
1170 DATA 50,47,45,42,40,38,36,34,32
1180 RESTORE 1270
1190 FOR X=1 TO 64
1200 READ N:NAC=INT(J(N)/256):NAF=J(N)-N
     AC
1210 READ N:NBC=INT(J(N)/256):NBF=J(N)-N
     BC
1220 CALL S,0,NAF:CALL S,1,NAC:CALL S,4,
     NBF:CALL S,5,NBC
1230 CALL S,&D,SHP
1240 FOR D=1 TO T:NEXT
1250 NEXT X
1260 STOP
1270 DATA 53,32,55,31,56,29,56,29,55,34,
     53,34,52,36,52,36,53,34,55
1280 DATA 34,48,32,48,32,50,31,52,31,53,
     29,53,29,51,31,49,31,48,32
1290 DATA 48,32,46,34,44,34,43,36,43,36,
     44,34,46,34,48,32,46,32,44
1300 DATA 36,43,36,41,29,41,31,53,32,55,
     31,56,29,56,29,55,34,53,34
1310 DATA 52,36,52,36,53,34,55,34,48,32,
     48,32,50,31,52,31,53,29,53
1320 DATA 29,51,31,49,31,48,32,48,32,46,
     37,44,37,43,39,43,39,44,39
1330 DATA 44,39,32,44,32,44,32,44,32,44,
     0,0
```

Testbed program

```
100 MODE 2:MC=&8000:MEMORY &7FFF:RESTORE
     120
110 FOR A=&8000 TO &801E:READ V$:POKE A,
     VAL("&"+V$):NEXT
120 DATA DD,21,27,80,AF,DD,23,DD,4E,00,F
     5,CD,34,BD,F1,3C,FE,0E,20,F1,C9
130 DATA DD,7E,02,DD,4E,00,CD,34,BD,C9
140 DIM W(15)
150 FOR N=0 TO 13:W(N)=0:NEXT
160 W(7)=&38:W(8)=&F
170 WINDOW #1,1,27,1,18
175 WINDOW #2,1,27,19,25
180 WINDOW 28,80,1,25
190 CLS #1:PRINT #1,"REG CONTENT":PRINT#
     1
200 CLS #2:RESTORE 350
210 FOR A=0 TO 13:READ A$:PRINT #1,HEX$(
     A,1),A$:NEXT A
220 FOR A=0 TO 13:LOCATE #1,6,A+3:PRINT
     #1,HEX$(W(A),2):NEXT A
230 M=255:INPUT #2,"REGISTER ";A$:IF A$=
     "" THEN STOP
240 IF A$="S" THEN GOTO 310
250 IF A$<"0" OR A$>"D" THEN GOTO 230
260 IF A$="7" THEN M=&3F
270 R=VAL("&"+A$)
280 INPUT #2,"REG VALUE AS xx ";B$:V=VAL
     ("&"+B$)
290 IF V<0 OR V>255 THEN GOTO 280
300 V=V AND M:W(R)=V
310 A=&8028
320 FOR X=0 TO 13:POKE A+X,W(X):NEXT
330 IF MC<>0 THEN CALL MC:GOTO 220
340 STOP
350 DATA "CH A FINE","CH A COARSE","CH B
     FINE","CH B COARSE"
360 DATA "CH C FINE","CH C COARSE","5 BI
    T NOISE"
370 DATA "00nn nttt","A AMP","B AMP","C
     AMP"
380 DATA "ENV FINE","ENV COARSE","ENV SH
     APE"
500 REM LASER
505 S=&8015
510 CALL S,7,&3E
520 CALL S,8,15
522 CALL S,1,1
530 FOR X=0 TO 255 STEP 30
540 CALL S,0,X:NEXT
550 FOR X=255 TO 0 STEP -8
560 CALL S,0,X:NEXT
570 CALL S,8,0
580 INPUT Z$:GOTO 520
600 S=&8015
602 CALL S,3,15
604 CALL S,7,&3C
606 CALL S,8,15
608 CALL S,9,10
610 T=12:F=7:GOSUB 650
612 T=10:F=6:GOSUB 650
614 T=8:F=5:GOSUB 650
615 FOR I=1 TO 3000:NEXT
616 CALL S,8,0
618 CALL S,9,0
624 STOP
650 FOR X=T TO F STEP -1
660 CALL S,1,X:CALL S,0,255
670 FOR N=255 TO 0 STEP -1
675 CALL S,0,N:NEXT N
680 NEXT X
690 RETURN
700 S=&8015
710 CALL S,6,31
720 CALL S,7,7
725 CALL S,8,16
730 CALL S,9,16
735 CALL S,10,16
740 CALL S,12,100
750 CALL S,13,0
790 STOP
800 S=&8015
802 FOR N=0 TO 9
804 CALL S,0,255
806 CALL S,1,0
808 CALL S,7,&3E
810 CALL S,8,15
812 FOR K=1 TO 300:NEXT
814 CALL S,0,86
816 CALL S,1,1
818 FOR K=1 TO 300:NEXT
820 NEXT N
830 CALL S,8,0
832 STOP
```

Figure 3

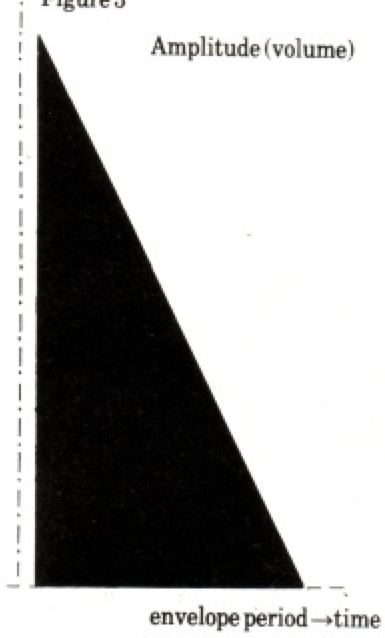
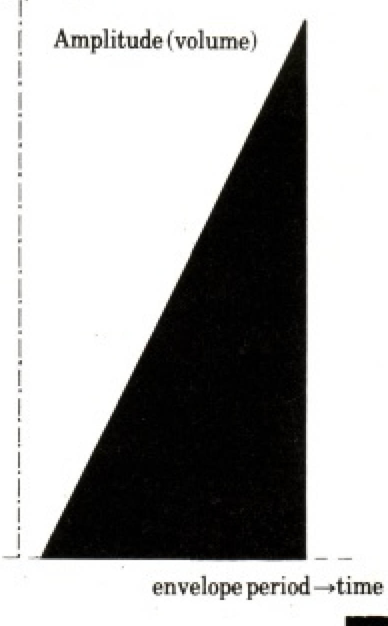
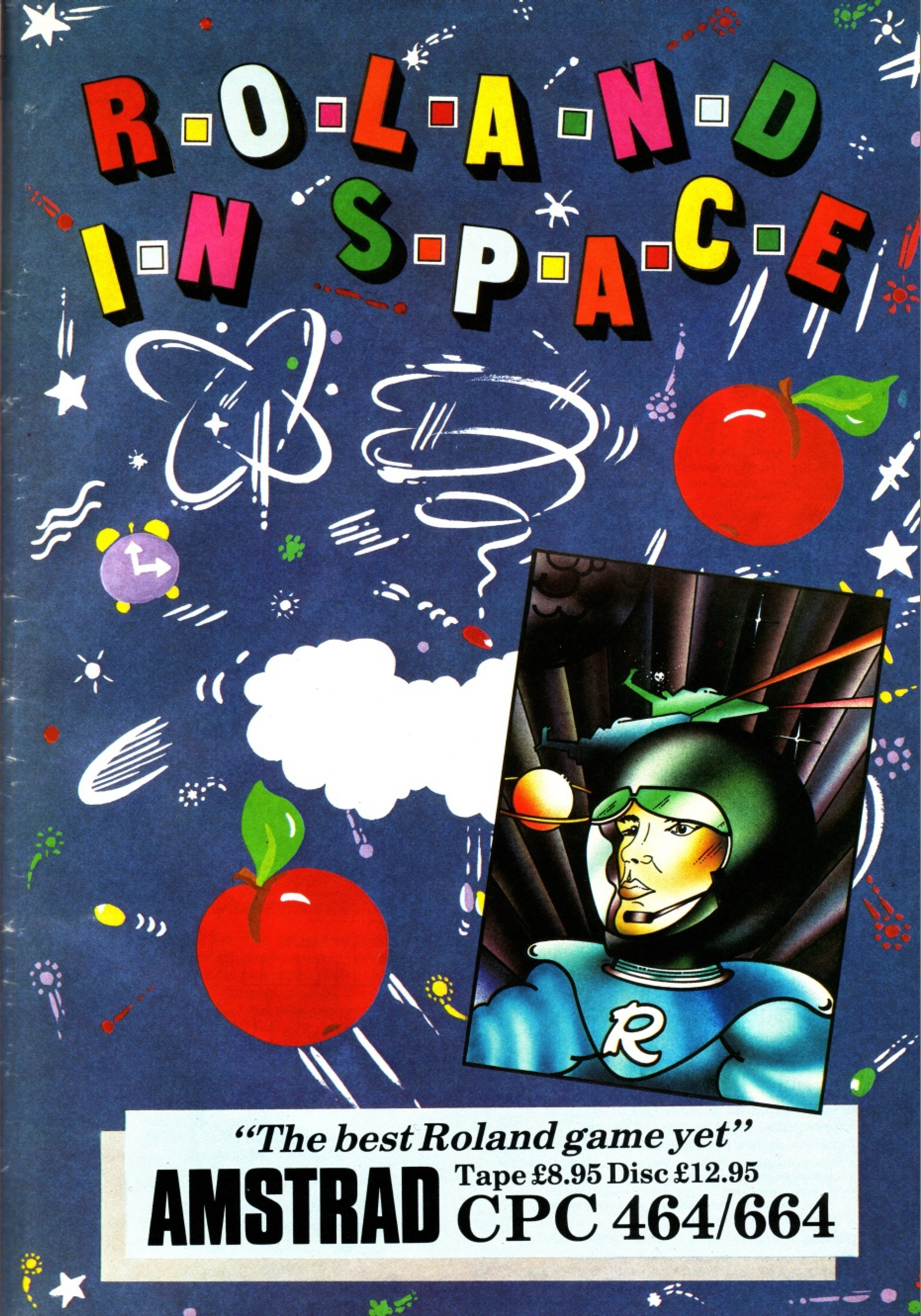


Figure 4



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Depth	610mm (24")
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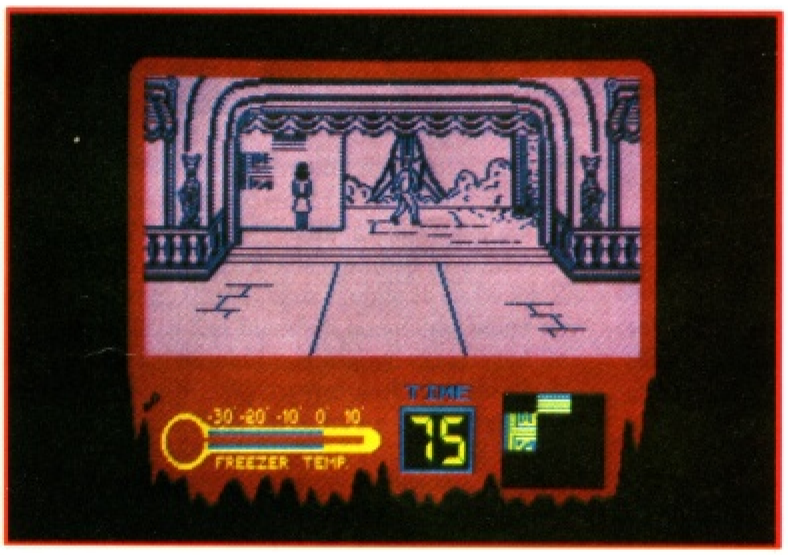
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THE ROCKY HORROR SHOW

I'm glad we caught you at home
Can we use your 'phone
We'll just say where we are
And go back to the car..

Brad Majors and his fiancee, Janet Weiss were on thier way to vist a friend when they got stuck in the middle of a forest with a flat tyre. The story of their vist to a strange mansion with even stranger denziens is told in the Stage play, film and now the computer game of Richard O'Briens 'The Rocky Horror Show'. A sub-plot of the original has been adapted to become the main plot of the game. Anti-Hero of the tale, one Dr. Frank 'n Furter has a laboratory stuffed with many interesting devices, among these is the 'Medusa machine', capable of turning anyone who crosses Frank to stone. There is only one remedy for this evil imprisonment - the 'De-Medusa', found on the stage in one of the downstairs rooms. In the game you take on the role of either Brad or Janet and have to rescue your partner.



The De-medusa device has been dismantled by Frankie and the parts scattered around the mansion. It is your job to re-build the device and rescue your partner before the house lifts off and to return to Transylvania, land of night (and high electricity bills - Ed). The cast roam the house and will hinder your movements. Riff-Raff the paranoid butler wanders 'round firing his laser. To quote the film:

Riff-Raff: (to Frankie):I am sorry if I misled you. When I said that we were to return, I referred only to Magenta and myself. You are to remain here... In spirt anyway.
Dr Scott: My God that's a laser.
Riff-Raff: Yes, Dr Scott a laser capable of emitting a beam of pure Anti-Matter. (To Frankie) So say good-bye to all of this.
Audience: Good-bye all of this.
Riff-Raff: And hello to oblivion.
Audience: Hi Oblivion, how's the wife and kids.
Frankie: I can explain



Audience: You better make it good, he shot you last week.

The Rocky Horror Picture Show is an audience participation film, and although the game is based on the stage show many of the features which add to the film are included in the game. Dr Scott (a friend of Brad and Janet) is not included in the program, but all the other players are. There is Magenta, Columbia - who will take your clothes and slow you down until you find them again, Eddie - a failed experiment who lives in the freezer and will ride around on his motorbike if things get too warm, and finally Rocky Horror - Franks creation ("I want to take Charles Atlas by the hand - In just seven days I will make you a man").

To get around the building you will need to find the keys to open various doors. Eddie is a major hazard, he will run you down without hesitation so it is in your interest to keep the freezer temperature down. To do this you need to brave the slippery freezer floor and press a button. As Brad and Janet found in the show the laboratory is a dangerous place. To get through it you will need to climb ladders and switch off a force field, then hot-foot it through the room before it re-activates itself.

Rocky Horror is not a ladders and platforms game, nor is it a shoot-em-up. A map is useful but not essential since you can learn your way around the house. I will not try to classify the game, instead I will leave the last word to CRL who remind you - **DON'T DREAM IT, PLAY IT!**

Author	CRL
Format	Cassette
Price	£8.95
Graphics	****
Playability	****
Addictiveness	*****
Overall	*****

ACU

Chord Finder

by Dave Ellis



Chord Finder shold prove invaluable to keyboard players. Over 2,000 chords can be displayed, including some of the more 'modern' ones. As well as displaying the chords, up to 36 chord shapes can be saved to tape and loaded in when required. This is especially useful where the chord shapes for a particular song need to be shown complete with the correct inversions.

Operation

The program consists of two main displays. The keyboard display is present at all times, but the lower half of the screen can be toggled between displaying the 'MENU of CHORDS' available, and the 'CHORDS SAVED' by pressing the small <ENTER> key on the numeric keypad. The chord shapes are selected by using the four cursor keys to place the large cursor over the required chord name. The root note of the chord is shown by the large up arrow sign directly under the keyboard. This can be moved in one direction only - to the right - by using the shifted right cursor key. The shifted left cursor key will 'home' the root note cursor to the C key. Chord inversions up and down can be displayed by using the > and < keys. To play the notes of the chord, press the large <ENTER> key. Because many of the chords will consist of 4 notes, it is not possible to play the actual notes simultaneously as the sound chip is restricted to 3 channels only. It's about time the chip manufacturers produced a 4 channel sound chip!

To save any chord to th second screen display, press the COPY key. You are then prompted to press any key from 0 - 9 or A - Z, giving total of 36. When you have saved some chords press the small <ENTER> key, and the chords saved will be displayed. Moving the cursor as before over the required chord will display the chord as originally saved, and the notes will also be played. To save the screen of 'CHORDS SAVED' to tape, return back to the 'MENU of CHORDS' screen and press the CTRL and S keys. You will asked for the filename that you wish to give to the 36 chords saved and then these will be saved to tape as a file in the normal manner. You do not need to use up all 36 spaces on the 'CHORDS SAVED' screen before saving them to tape - unused spaces will be saved as '----'.

Previously saved chords can be loaded back into the program by pressing the CTRL and L keys.

At all times a Help menu is available for both of the screens by pressing the CTRL and H keys. These will list all the operations of the various keys. Most of the operations are accessed when the 'MENU of CHORDS' screen is in operation. Pressing the DEL key will erase any chords currently saved. This is done by issuing the RUN command so be careful not to press it in error. You should find the program simple to operate thnks to the ue of the 'floating cursor'.

Notes for Musicians

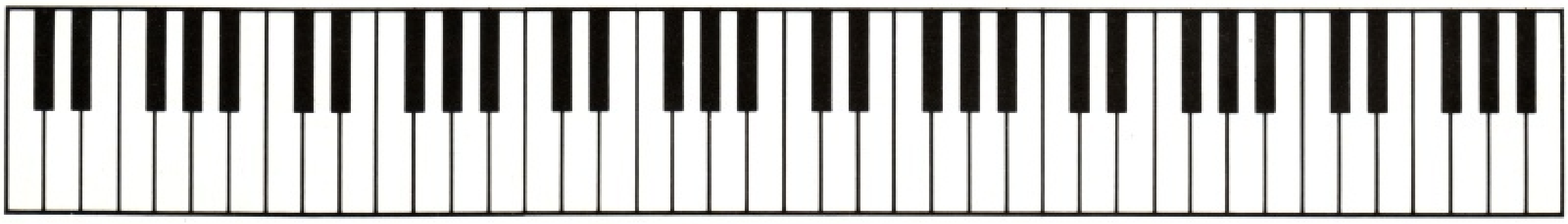
There is a lot of confusion over chords symbols - different publishers use different characters - sometimes correctly - more often than not incorrectly! Some of the common misunderstandings are:

'+' The plus sign means to AUGMENT (AUG for short). This raises the fifth note of the scale by half a tone. It is often used incorrectly to denote a sharpened ninth eg. C7 +9 when it should read C7 #9. How do you know which one it should be? Well you will have to try both if in doubt and let your ear decide which is correct. The difference between an augmented fifth and a sharpened ninth is huge! If you're still in doubt then I suggest that you take up stamp collecting.

'−' The minus sign is often used to replace 'b' or 'B' which represents a flattened note. So C7 - 9 is the same as C7 B9.

'4' This is sometimes used instead of SUS (Suspend). Suspend refers to raising the third note of the scale by half a tone, which is, in effect the fourth note on the scale, hence the '4'.

Chords are sometimes followed by a slash and another note...eg Gm7/F. This denotes that a Gm7 chord is to be played, but the root note (for the bass pedal on organ) is to be F.



You may also get something like...Gm7/C. Although this is technically correct it is really a C11 chord. In fact, many chords have the same four notes although the root note may be different. For example... C6, Am7, and D11 use the same four notes of the keyboard. The only difference is in the root note used ie. C, A, and D.

Using Chord Finder you should be able to test these out for yourself. Is it possible to memorise all 2,000 or so chords? Well, quite frankly I would say no. I can find any chord on the keyboard very quickly without the need for looking it up in a book, or using Chord Finder. If you know the correct technique it's as easy as ABC. However, until that time I am sure that you will find Chord Finder very useful.

```
10 '        ************************************************
15 '        *                              *
20 '        *   CHORD FINDER.  by Dave Ellis. 5-5-85      *
25 '        *                              *
30 '        ************************************************
40 '
50 GOSUB 1000:GOSUB 2000:GOSUB 4000:GOSUB 16000:GOSUB 3000
60 x=1:y=1:array=1:GOSUB 20000:GOSUB 25000:GOSUB 9000:GOSUB 7000
70 POKE &B4E8,0:REM Main Loop Starts Here.
80 IF INKEY(1)=0 THEN GOSUB 20000:GOSUB 22000:GOSUB 9000:GOSUB 7000
90 IF INKEY(2)=0 THEN GOSUB 20000:GOSUB 23000:GOSUB 9000:GOSUB 7000
100 IF INKEY(8)=0 THEN GOSUB 20000:GOSUB 24000:GOSUB 9000:GOSUB 7000
110 IF INKEY(0)=0 THEN GOSUB 20000:GOSUB 21000:GOSUB 9000:GOSUB 7000
120 IF INKEY(18)=0 THEN GOSUB 13000
130 IF INKEY(60)=128 THEN GOSUB 14000
140 IF INKEY(36)=128 THEN GOSUB 15000
150 IF INKEY(39)=0 THEN GOSUB 11000
160 IF INKEY(31)=0 THEN GOSUB 12000
170 IF INKEY(9)=0 THEN GOSUB 8000
180 IF INKEY(6)=0 THEN GOSUB 9000:screen=0:GOSUB 19000
190 IF INKEY(8)=32 THEN home=1:GOSUB 27000:GOSUB 9000:GOSUB 7000
200 IF INKEY(44)=128 THEN GOSUB 17000
210 IF INKEY(79)=0 THEN RUN
220 IF INKEY(1)<>32 THEN 70
230 GOSUB 27000:GOSUB 20000:GOSUB 25000:GOSUB 9000:GOSUB 7000:GOTO 70
1000 '********************SET UP STRINGS, ARRAYS ETC****************************
1010 MODE 2:INK 1,1:INK 0,20:BORDER 20:POKE &B4E8,0:WINDOW #1,6,74,16,24
1020 SYMBOL AFTER 32:CLS:DIM position(30),pitch(30)
1030 DIM a$(36),t$(36),chord(36,30),chord$(36),base$(30),root(36),amount(36)
1040 g$=STRING$(2,32):h$=STRING$(5,32):b$=STRING$(2,CHR$(143))
1050 s2$=h$+b$+g$+b$+g$+b$:s3$=" "+h$+b$+g$+b$+" ":sharp$=s2$+s3$+s2$+s3$+s2$
1060 white$=CHR$(91)+CHR$(93):black$=CHR$(123)+CHR$(125)
1070 continue$="   Press <SPACE  BAR>  to continue":root$=CHR$(204)+CHR$(205)
1080 n$="F   G   A   B   C   D   E   F   G   A   B   C   D   E   F   G   A   B"
1090 SYMBOL 91,1,3,15,63,63,15,3,1:SYMBOL 93,128,192,240,252,252,240,192,128
1100 SYMBOL 123,254,252,240,192,192,240,252,254
1110 SYMBOL 125,127,63,15,3,3,15,63,127
1120 DEF FN array=(y)+(INT(x/18)*9):base=20:root=0
1130 FOR x=20 TO 44 STEP 2 :READ base$(x-19):NEXT:RETURN
1140 DATA  C,C#,D,D#,E,X,F,F#,G,G#,A,A#,B
2000 '********************READ IN CHORD DATA*************************************
2010 FOR x=1 TO 36:READ a$(x),t$(x):NEXT:RETURN
2020 DATA 047,MAJOR,047b,MAJ 7,247b,MAJ 9,037,MINOR,0379,MIN 6,037a,MIN 7,237a
2030 DATA MIN 9,036,MIN B5,036a,MIN7B5,037b,MINMAJ,0369,DIMIN,057,SUSPEND
2040 DATA 048 ,AUG(+),0479, 6TH,2479,6/9,047a,7TH,057a,7 SUS,048a,7 +,148a
2050 DATA 7+ B9,046a,7 B5,147a,7 B9,146a,7 B9 B5,347a,7 #9,346a,7 #9 B5,247a
2060 DATA 9TH.,257a,9 SUS,248a,9TH +,246a,9TH B5,247b,9 MAJ 7,269a,9/13 B5,257a
2070 DATA 11TH.,249a,13TH.,259a,13 SUS,248a,13 +,246a,13 B5,149a,13 B9
3000 '********************DISPLAY CHORD MENU*************************************
3010 screen=1:LOCATE 20,14:PRINT STRING$(30,32)
3020 LOCATE 30,25:PRINT CHR$(24) " MENU of CHORDS " CHR$(24);
3030 LOCATE base,14:PRINT CHR$(204);CHR$(205):note$=base$(base-19)
3040 IF LEN(note$)=1 THEN note$=note$+" "
3050 LOCATE 36,1:PRINT note$:FOR x=0 TO 3:FOR y=1 TO 9
3060 LOCATE #1,x*18+2,y:PRINT #1,t$(y+x*9):NEXT y,x:RETURN
4000 '********************READ IN NOTE POSITIONS*********************************
4010 FOR x=0 TO 30:READ position(x),pitch(x):NEXT:RETURN
4020 DATA 4,358,6,338,8,319,10,301,12,284,14,268,16,253,20,239,22,225,24,213,26
4030 DATA 201,28,190,32,179,34,169,36,159,38,150,40,142,42,134,44,127,48,119,50
4040 DATA 113,52,106,54,100,56,95,60,89,62,84,64,80,66,75,68,71,70,67,72,63
5000 '********************DISPLAY CHORDS SAVED**********************************
5010 GOSUB 9000:screen=0
5020 LOCATE 30,25:PRINT CHR$(24) " CHORDS SAVED " CHR$(24);
5030 LOCATE 20,14:PRINT STRING$(30,32):CLS #1
5040 FOR x=0 TO 3:FOR y=1 TO 9
5050 LOCATE #1,x*18+2,y:chord$=chord$(y+x*9):GOSUB 5070
5060 NEXT y,x:LOCATE 36,1:PRINT STRING$(15,32):RETURN
5070 IF chord$="" THEN PRINT #1," -----":RETURN ELSE PRINT #1,chord$:RETURN
6000 '********************PRINT/CLEAR NOTES**************************************
6010 IF position/4 <> INT(position/4) THEN place=6 ELSE place=11
6020 LOCATE position,place:IF blank=1 THEN 6040
6030 IF place=6 THEN PRINT black$:RETURN ELSE PRINT white$:RETURN
6040 IF place=6 THEN PRINT CHR$(143);CHR$(143) ELSE PRINT STRING$(2,32)
6050 RETURN
7000 '********************CALCULATE NOTE NUMBERS*********************************
7010 n(4)=0:FOR z=1 TO LEN(a$(FN array))
7020 v=VAL("&"+MID$(a$(FN array),z,1))+7+root
7030 n(z)=v:size=z:position=position(v)
7040 IF noise=1 THEN SOUND 1,pitch(v),50:noise=0
7050 blank=0:GOSUB 6000:NEXT:RETURN
8000 '********************SAVE CHORDS TO ARRAY**********************************
8010 POKE &B4E8,255:LOCATE 60,1:PRINT CHR$(24);" press 0-9 or A-Z ";CHR$(24)
8020 a$=INKEY$:IF a$="" THEN 8020
8030 a=ASC(a$):IF a>90 THEN 8020
8040 IF a<48 THEN 8020
8050 IF a>57 AND a<65 THEN 8020
8060 IF a>64 THEN a=a-54 ELSE a=a-47
8070 chord$(a)=base$(base-19)+" "+t$(FN ARRAY):root(a)=base
8080 chord(a,1)=n(1):chord(a,2)=n(2):chord(a,3)=n(3):chord(a,4)=n(4)
8090 IF n(4)=0 THEN amount(a)=3 ELSE amount(a)=4
8100 LOCATE 60,1:PRINT STRING$(18,32):POKE &B4E8,0:RETURN
9000 '********************CLEAR THE KEYBOARD*************************************
9010 blank=1:FOR p=1 TO 4
9020 IF screen=1 THEN v=n(p) ELSE v=chord(FN array,p)
9030 position=position(v):GOSUB 6000:NEXT p:RETURN
10000 '********************PLAY CHORDS SAVED**************************************
10010 LOCATE 20,14:PRINT STRING$(30,32):GOSUB 9000:number=FN array
10020 IF root(number)<>0 THEN LOCATE root(number),14:PRINT CHR$(204);CHR$(205)
10030 FOR z=1 TO amount(number)
10040 position=position(chord(number,z)):SOUND 1,pitch(chord(number,z)),50
10050 blank=0:GOSUB 6000:NEXT:RETURN
11000 '********************INVERSION DOWN*****************************************
11010 FOR z=1 TO 4:blank=1:v=n(z):position=position(v):GOSUB 6000:NEXT
11020 IF size=4 AND n(4)-12<0 THEN 11070
11030 IF size=3 AND n(3)-12<0 THEN 11070
11040 IF size=3 THEN 11060
11050 sw=n(4)-12:n(4)=n(3):n(3)=n(2):n(2)=n(1):n(1)=sw:GOTO 11070
11060 sw=n(3)-12:n(3)=n(2):n(2)=n(1):n(1)=sw
11070 FOR z=1 TO size:blank=0:v=n(z):position=position(v)
```



```
11080 GOSUB 6000:NEXT:RETURN
12000 '********************INVERSION UP****************************************
12010 FOR z=1 TO 4:blank=1:v=n(z):position=position(v):GOSUB 6000:NEXT
12020 sw=n(1)+12:IF sw>30 THEN 12050
12030 n(1)=n(2):n(2)=n(3):IF size=3 THEN n(3)=sw:GOTO 12050
12040 n(3)=n(4):n(4)=sw
12050 FOR z=1 TO size:blank=0:v=n(z):position=position(v)
12060 GOSUB 6000:NEXT:RETURN
13000 '********************PLAY THE NOTES**************************************
13010 FOR z=1 TO size:SOUND 1,pitch(n(z)),50:NEXT
13020 FOR z=1 TO 500:NEXT:RETURN
14000 '********************SAVE CHORDS TO TAPE**********************************
14010 CALL &BB00:LOCATE 10,14:INPUT"Enter File name ";filename$
14020 LOCATE 35,13:OPENOUT filename$:FOR z=1 TO 36
14030 PRINT #9,chord$(z):PRINT #9,STR$(root(z)):PRINT# 9,STR$(chord(z,1))
14040 PRINT #9,STR$(chord(z,2)):PRINT #9,STR$(chord(z,3))
14050 PRINT #9,STR$(chord(z,4)):PRINT #9,STR$(amount(z))
14060 NEXT:CLOSEOUT
14070 LOCATE 1,14:PRINT STRING$(40,32):LOCATE 1,15:PRINT STRING$(40,32)
14080 base=base-2:root=root-1:GOSUB 27000:RETURN
15000 '********************LOAD CHORDS FROM TAPE********************************
15010 LOCATE 35,13:OPENIN "":FOR z=1 TO 36
15020 LINE INPUT #9,chord$(z):LINE INPUT #9,temp$:root(z)=VAL(temp$)
15030 FOR zz=1 TO 4:LINE INPUT #9,temp$:chord(z,zz)=VAL(temp$):NEXT zz
15040 LINE INPUT #9,temp$:amount(z)=VAL(temp$)
15050 NEXT:CLOSEIN:GOSUB 14070:RETURN
16000 '********************DRAW KEYBOARD****************************************
16010 LOCATE 28,1:PRINT "CHORD = C  MAJOR"
16020 FOR x=3 TO 7:LOCATE 15,x:PRINT sharp$:NEXT
16030 ORIGIN 15,350:DRAWR 575,0,1:ORIGIN 15,200:DRAWR 575,0,1:ORIGIN 15,200
16040 FOR x=15 TO 608 STEP 32:ORIGIN x,200:DRAWR 0,150,1:NEXT
16050 LOCATE 4,3:PRINT n$:LOCATE 20,14:PRINT CHR$(204);CHR$(205)
16060 LOCATE 1,1:PRINT "Press CTRL H for HELP.";:RETURN
17000 '********************HELP MENU...SCREEN 1*********************************
17010 CLS #1 :tempx=x:tempy=y
17020 PRINT #1,"      ";CHR$(240);" - Move cursor UP";
17030 PRINT #1,"      large ENTER - Play the notes"
17040 PRINT #1,"      ";CHR$(242);" - Move cursor LEFT";
17050 PRINT #1,"   small ENTER - Display chords saved"
17060 PRINT #1,"      ";CHR$(243);" - Move cursor RIGHT";
17070 PRINT #1,"             > - Inversion UP"
17080 PRINT #1,"      ";CHR$(241);" - Move cursor DOWN";
17090 PRINT #1,"             < - Inversion DOWN"
17100 PRINT #1,"SHIFT ";CHR$(243);" - Move ROOT NOTE RIGHT";
17110 PRINT #1,"     CTRL S - SAVE chords to tape"
17120 PRINT #1,"SHIFT ";CHR$(242);" - HOME ROOT NOTE";
17130 PRINT #1,"             CTRL L - LOAD chords from tape"
17140 PRINT #1,"  COPY - COPY chord to array";
17150 PRINT #1,"      CTRL H - Display HELP menu"
17160 PRINT #1,"   DEL - DELETE all chords in array"
17170 LOCATE 17,25:PRINT continue$
17180 a$=INKEY$:IF a$<>CHR$(32) THEN 17180
17190 CLS #1:LOCATE 17,25:PRINT STRING$(40,32):GOSUB 3000
17200 x=tempx:y=tempy:show$=t$(FN array):GOSUB 25000:RETURN
18000 '********************HELP MENU...SCREEN 0*********************************
18010 CLS #1 :tempx=x:tempy=y
18020 PRINT #1,"            ";CHR$(240);" - Play chord UP"
18030 PRINT #1,"            ";CHR$(242);" - Play chord LEFT"
18040 PRINT #1,"            ";CHR$(243);" - Play chord RIGHT"
18050 PRINT #1,"            ";CHR$(241);" - Play chord DOWN"
18060 PRINT #1,"large ENTER - Play the notes"
18070 PRINT #1,"small ENTER - Return to CHORD MENU"
18080 PRINT #1,"      CTRL H - Display HELP MENU"
18090 PRINT #1:LOCATE 17,25:PRINT continue$
18100 a$=INKEY$:IF a$<>CHR$(32) THEN 18100
18110 CLS #1:LOCATE 17,25:PRINT STRING$(40,32):GOSUB 5020
18120 x=tempx:y=tempy:show$=chord$(FN array)
18130 GOSUB 25000:GOSUB 10000:RETURN
19000 '********************KEY INPUTS...CHORDS SAVED***************************
19010 GOSUB 5000:x=1:y=1:array=1:GOSUB 20000:GOSUB 25000:GOSUB 10000
19020 show$=chord$(FN array):IF INKEY(1)=0 THEN GOSUB 22000
19030 POKE &B4E8,0:IF INKEY(2)=0 THEN GOSUB 23000
19040 IF INKEY(8)=0 THEN GOSUB 24000
19050 IF INKEY(0)=0 THEN GOSUB 21000
19060 IF INKEY(18)=0 THEN GOSUB 10000
19070 IF INKEY(44)=128 THEN GOSUB 18000
19080 IF INKEY(6)<>0 THEN 19020
19090 CLS #1:GOSUB 9000:GOSUB 3000:x=1:y=1:array=1
19100 GOSUB 20000:GOSUB 25000:GOSUB 9000:GOSUB 7000:RETURN
20000 '********************WHICH SCREEN ?***************************************
20010 show$=t$(FN array):IF screen=0 THEN show$=chord$(FN array)
20020 RETURN
21000 '********************UP KEY**********************************************
21010 GOSUB 26000:y=y-1:IF y<1 THEN y=1
21020 GOSUB 28000:RETURN
22000 '********************RIGHT KEY*******************************************
22010 GOSUB 26000:x=x+18:IF x>56 THEN x=55
22020 GOSUB 28000:RETURN
23000 '********************DOWN KEY********************************************
23010 GOSUB 26000:y=y+1:IF y>9 THEN y=9
23020 GOSUB 28000:RETURN
24000 '********************LEFT KEY********************************************
24010 GOSUB 26000:x=x-18:IF x<1 THEN x=1
24020 GOSUB 28000:RETURN
25000 '********************PRINT REVERSE FIELD*********************************
25010 LOCATE #1,x,y:PRINT #1, CHR$(24);" ";show$;" ";CHR$(24)
25020 LOCATE 39,1:PRINT show$;STRING$(10,32):RETURN
26000 '********************CLEAR NOTES AND REVERSE*****************************
26010 GOSUB 9000:LOCATE #1,x,y:PRINT #1," ";show$;" ":RETURN
27000 '********************CHANGE ROOT NOTE************************************
27010 FOR delay=1 TO 100:NEXT
27020 LOCATE base,14:PRINT "  ":base=base+2:IF base>44 THEN base=20
27030 IF home=1 THEN base=20:home=0:root=0 ELSE root=root+1
27040 IF root>11 THEN root=0
27050 IF base=30 THEN base=32
27060 note$=base$(base-19):IF LEN(note$)=1 THEN note$=note$+CHR$(32)
27070 LOCATE 36,1:PRINT note$:LOCATE base,14:PRINT CHR$(204);CHR$(205)
27080 RETURN
28000 '********************UP..DOWN..RIGHT..LEFT*******************************
28010 IF screen=0 THEN GOSUB 10000
28020 GOSUB 20000:GOSUB 25000:RETURN
```

ACU



Amsoft's £2000 Software Competition

This month's Software Competition was surprisingly rewarding to judge. There were fewer entries than usual, probably due to the exam season and all the budding programmers being away on holiday, the entries we did have turned out to be very good.

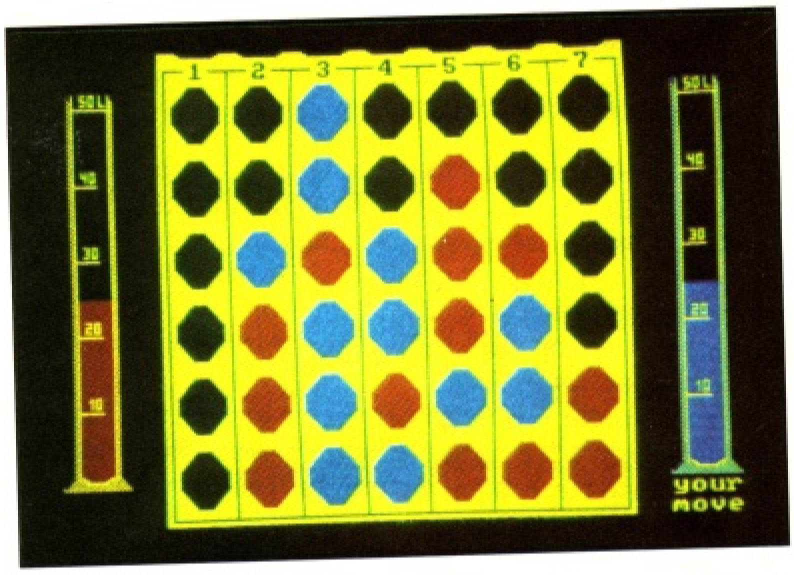
First prize goes to K. N. Khaleque who submitted a first rate ladders and platforms game called "Miner Mania". In this you have to guide 'Miner Tim' through thirty caverns, this may sound familiar to 'Manic Miner' fans and the game does bear more than a passing resemblance to the Software Projects game. This, however, was the best entry we have had for the competition so Mr Khaleque wins £1000. Miner Mania is technically very good, there are some beautiful sprites and continuous music. All the speed-critical bits are written in machine code with the general dressing and instructions in Basic. Even more impressive is that the author wrote the game without an assembler, instead he wrote and used his own monitor.

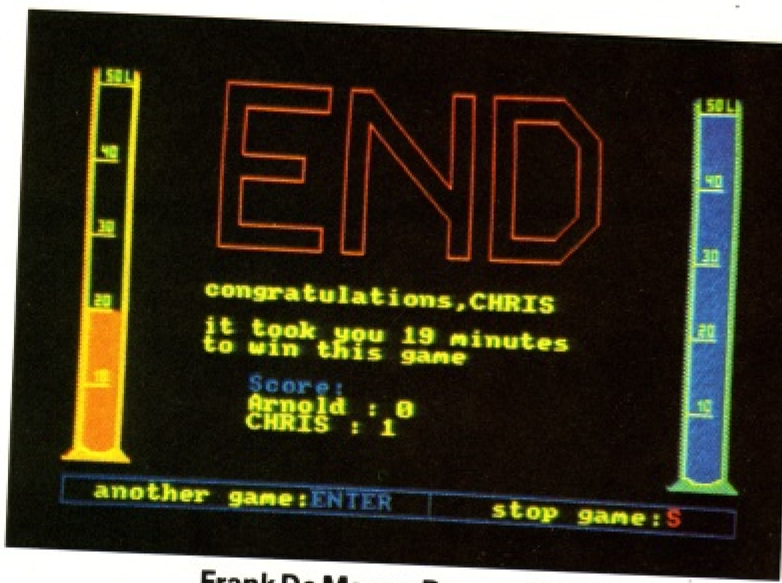




K. N. Khaleque - Miner Mania

Second Prize of £600 goes to Frank De Mayer for "Droppy Disc". He owns an Okimate 20 colour printer and has put it to good use with his documentation. The program is based on the 'Connect 4' game, you have to arrange four counters in a row whilst stopping your opponent from doing the same. Mr De Mayer has added a gambling element to Droppy Disc. You stake a given number of litres of water on winning the next game. The winner is the first player to either fill a tube or empty the opponents tube. The computer can be set to play at different levels, from good to unbeatable (well almost). The use of colour planes and some nifty sound routines add great finishing touches to this program.

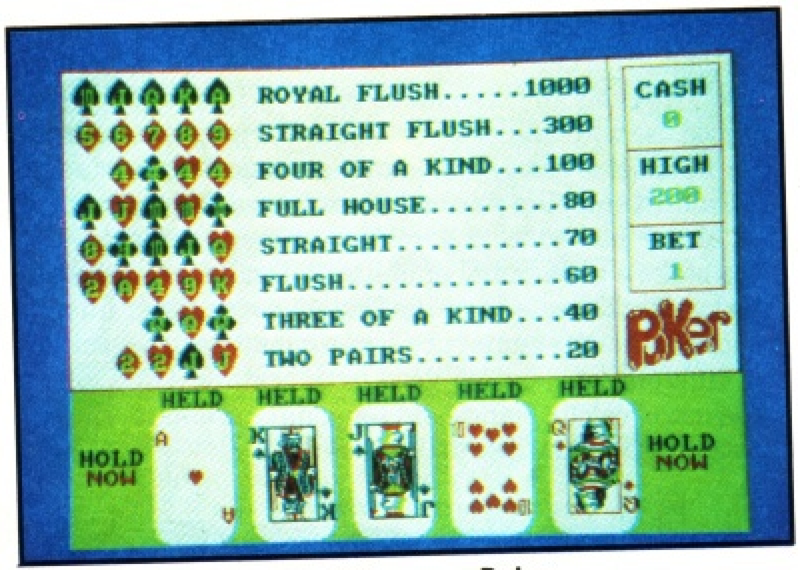




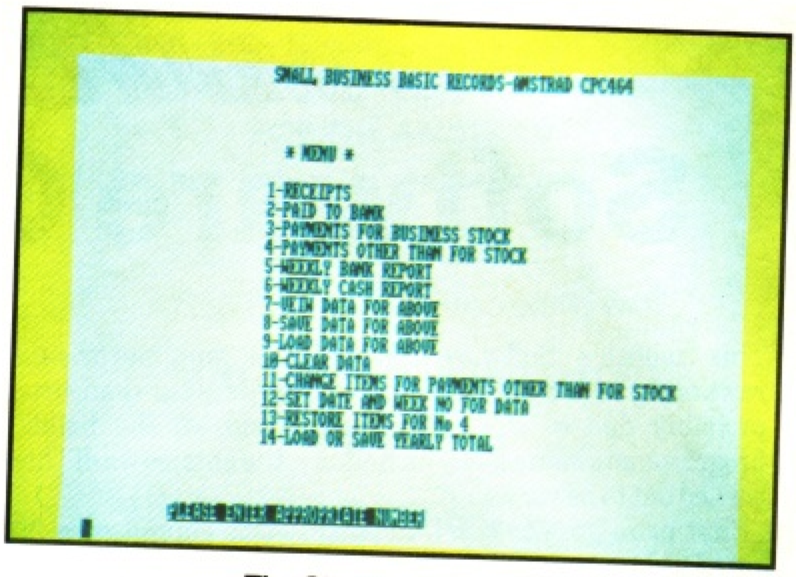
Frank De Mayer - Droppy Disc

Third Prize goes to Peter Wiseman for "Poker" This was not the first time we had seen a poker program but it was the execution of this version which won it £400. Both the display and the presentation of the documentation would shame

some so-called professional poker programs. Careful use of user defined symbols provides an accurate and colourful display. The computer plays a fair game with user friendly inputs. Once again this winner was turned from being 'Just another entry' into a top program by a host of little touches, a pretty 'Poker!' logo, a neat inlay card and comprehensive instructions.



Peter Wiseman - Poker

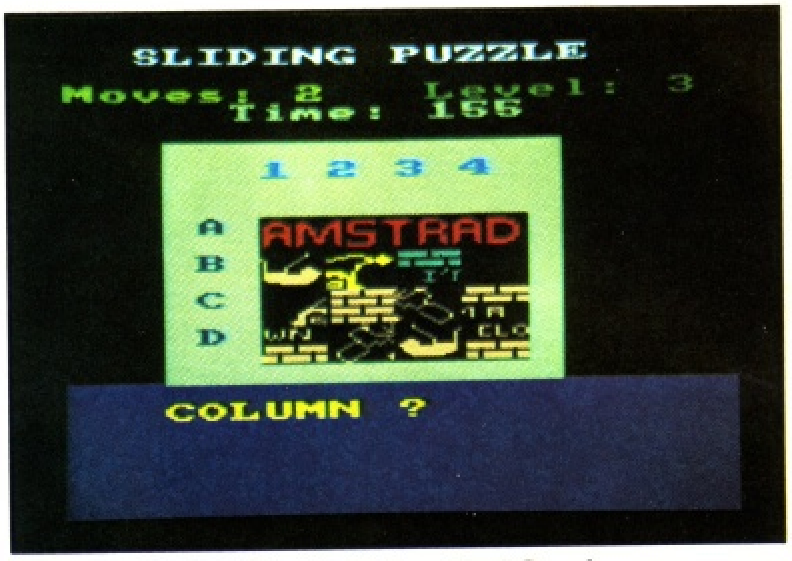


Tim Gilbert - Business

As usual there were many good entries which did not make it into the prize-winning league. Some of these will go into a compilation of listings we are planning to produce for the end of the year. If you have submitted an entry to any competition and have not heard from us then please be patient, the huge backlog is being worked on now and you should hear from us soon.

On the whole, arcade games were a bit thin on the ground, John Wright's "Caverns of Skeltor" was an exception to this rule, a nice maze game written in Basic with multi-colour characters.

Sliding Block puzzle by Said Shadi is only 133 lines long and shows how a neat bit of Basic can make a very playable game. There are options which allow you to watch the computer shuffle the titles and, if you give up, to watch the computer unscramble the titles.



Said Shadi - Sliding Block Puzzle



John Wright - Caverns of Skeltor



Meat - G Steen

Overall a good set of entries this month, keep them coming, preferably on disc and only if you are a member of the user group.

ACU

£2,000 program competition!

Think what you could buy with a £2,000 windfall...

The objective couldn't be simpler: write the best program submitted to the AMSTRAD USER review panel. Every other month £2,000 will be shared amongst the very best entries.

RULES

1 The winner(s) will be the entrant or entrants who submit the best program. It may be any piece of software that runs on the CPC464 or CPC664

2 The name of all the winners will be printed in the next available issue of Amstrad User.

3 All entries must arrive by October 1st 1985. Entries arriving after that date will be included in the next issue's competition.

4 All entries must INCLUDE a disc or cassette copy of the program (plus loading instructions where necessary!), AND A SIGNED COMPETITION ENTRY FORM. A full listing would be helpful, but not essential. A brief summary of the program and its purpose should accompany all entries.

5 All entries will be treated in strict confidence.

6 Neither AMSOFT nor AMSTRAD can be held to be responsible for any loss or damage to any submission.

7 No correspondence can be entered into concerning programs submitted for the cash prize competition.

8 The decision of the judges is final.

9 It is a condition of entry that all entrants have exclusive ownership of the copyright of the material submitted, and that the winners agree to assign all copyright in the winning program to Amstrad.
All entrants must undertake not to submit the same or a similar program to any other magazine, publisher or organisation until after the announcement of the winning entry.

10 Amsoft may offer to publish programs either in Amstrad User or as commercial software, in which case Amsoft will agree the terms on an individual basis with the author(s) concerned. Amsoft reserves the right to amend, alter or revise any program that is published.

11 No employees of Amsoft or Amstrad, or their relatives may enter this competition.

12 All entries must have the name and address of the programmer as REM's in the first few lines of the program or loader.

HOW TO ENTER:

Think about your program, and map it out in a series of events or features. Write the program onto cassette, based around these events and check that the program runs as intended. Once you are satisfied, send a copy of the cassette in a suitable envelope along with the following:

1) A brief summary of the program in 500 words or less.

2) The completed competition entry form, which must be signed.

3) Program listings, if available.

4) SAE if you want your entry returned.

SOFTWARE *COMPETITION*

No entry is valid unless accompanied by this official entry form.
Only User Club members are eligible to enter.

User Club Membership Number ....
Name ....
Address ....
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Postcode ....
Telephone number ....

***NB All programs must be submitted in UNprotected form. Preferably on disc.**
I have read the rules published in AMSTRAD COMPUTER USER, and agree to be bound by them.
I have enclosed:

- ☐ **Tape/disc**
- ☐ **Listing**
- ☐ **SAE for the return of my entry**
- ☐ **A summary of up to 500 words**

I am over 18 years of age. YES/NO: Age if under 18 ....
(The signature of a parent or guardian is required where the entrant or the nominated representative of the entrants is under 18 years of age.)

SIGNATURE .... **Date** ....
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Games of the month: Beach-Head, Rocky Horror Show, Dun Daragh

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Least Significant Bit

The Lumbering Giant

It's as well to remind ourselves from to time that the Amstrad BASIC benchmarks are actually considerably faster than those of an almighty IBM PC. Indeed, much else that Arnold does is rather better conceived and elegantly executed. Your scribe was reminded of this fact the other day when laboriously formatting and copying discs on a PC. I had to go back to the 664 to confirm that it wasn't my imagination after all, and that an IBM PC is actually ludicrously slow despite all its grandeur.

In comparison, the CPC664 is a positive delight to use.

The Great Free Software Bonanza

The program listings disc offered via Garwood has been aquiring a little extra spice in the shape of some of the material from the Public domain software libraries for CP/M users. After all, if you have 70k or so going spare after the material from the issue is implanted thereon, why not fill 'er up with some of the selected morsels from the CPMUG?

Part of the catalogue of software available is included on this month's disc (the contents of the indices themselves fill over 4 discs!), and no doubt more index next month. The useful MFT file transfer utility is also provided to simplify single drive copying (and tell you what's going on at the same time).

It's all more evidence that by choosing to follow the CP/M route from day one, Amstrad have thrown the system wide open to the broadest possible following and now there's over 30MBytes of material there for the browsing.

Since much of the material is available in source form, it provides a valuable opportunity to learn by browsing other's work. Let's hope that Amstrad computer owners will rapidly start contributing to the library so that we will have our own fully fledged subsection. If you don't mind if your old competition submissions are donated to this worthy cause, then please let us know.

Creative Competitons

When Amsoft throws its great pile of £1 notes up in the air every other month in the name of the software competition, it would be nice to have a little more direction for at least part of the entry.

The trouble is, how to come up with a suitable plot every time.

The answer occured in a blinding flash. Take an item from the CP/M software library, and customise it for Amstrad use! Wonderful. All those obscure Microsoft and RML BASIC programs can be levered into the CPC system, sprayed with LOCATEs and SOUNDs, and suddenly good ole Startrek, Biorythms and the like spring to life.

The core of the program is there already, all (all?) you need do is correct the syntax for the cases where AMSTRAD BASIC diverges from MS, and add a little colour and sound.

The next listing disc contains a public domain Biorythm program, although if you already have access, don't let this delay you from picking a subject and crafting it for Amstrad BASIC. Advanced users might like to have a go at installing things like screen editors and compilers. Or polishing the Z80 assembler included on the issue 8 listings disc.

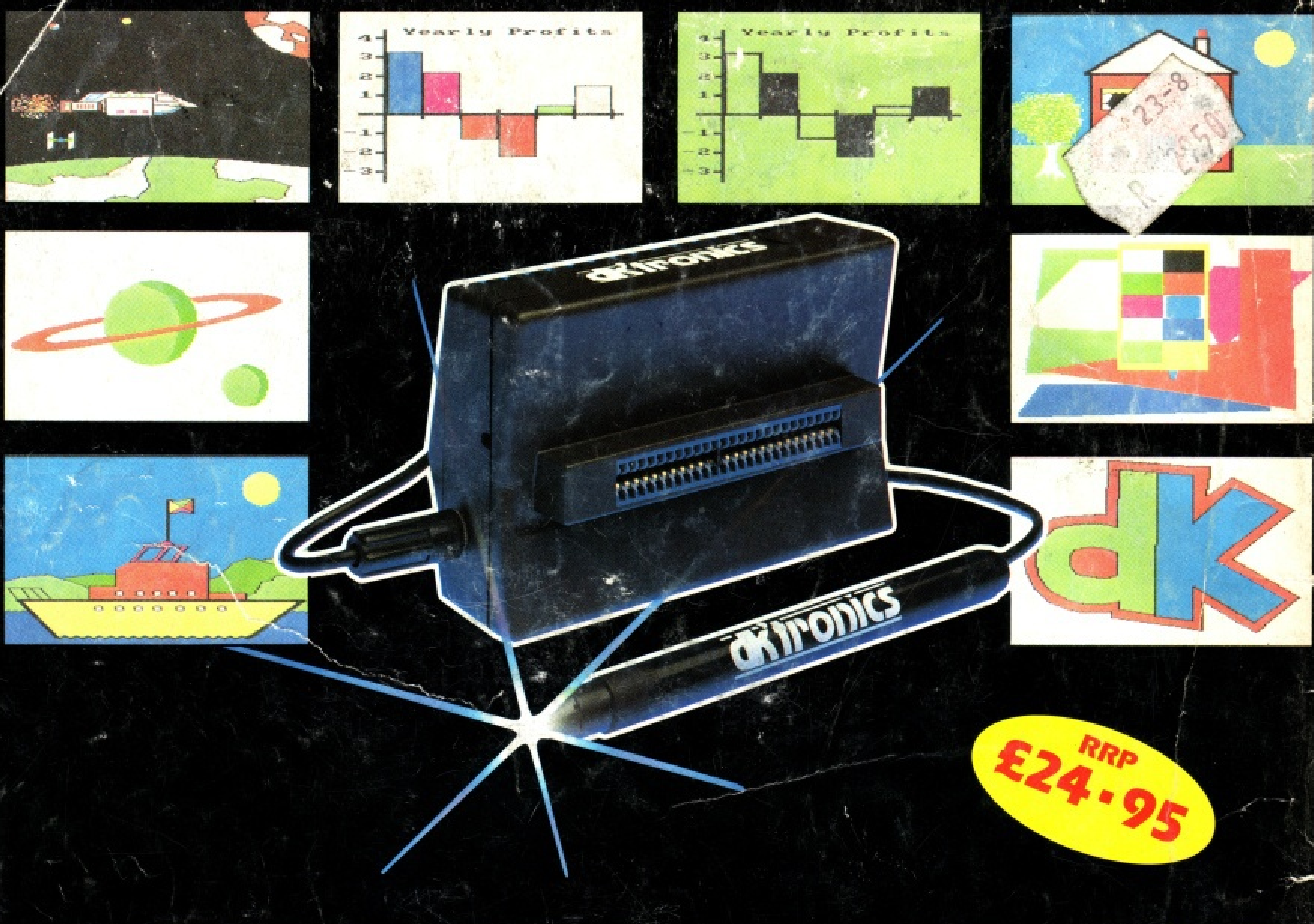
Socks on tight?

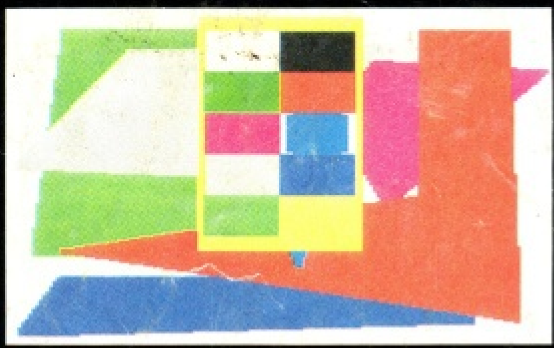
Watch out for our next issue. There's a couple of events being planned that will blow your hoisery off.

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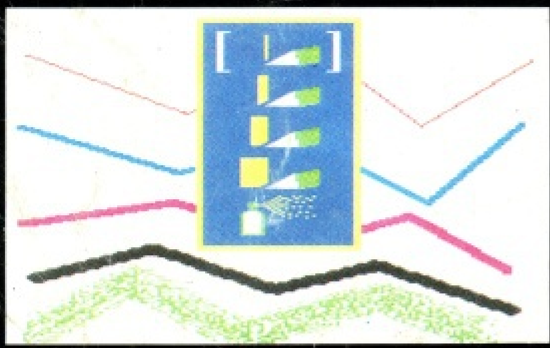
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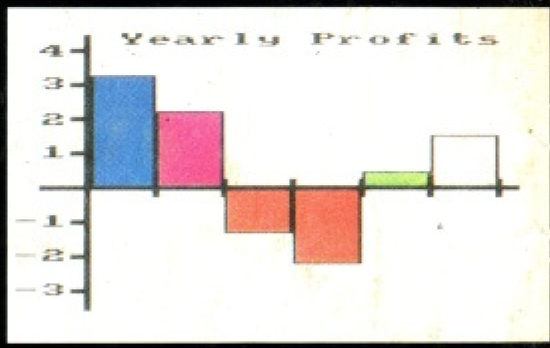




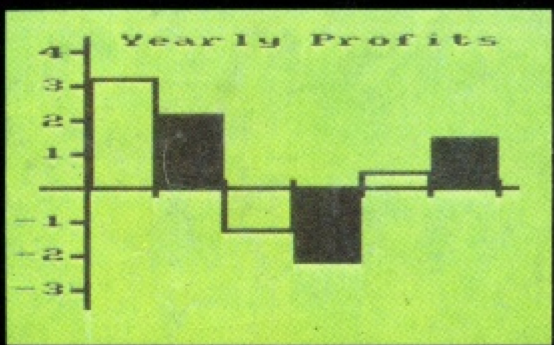
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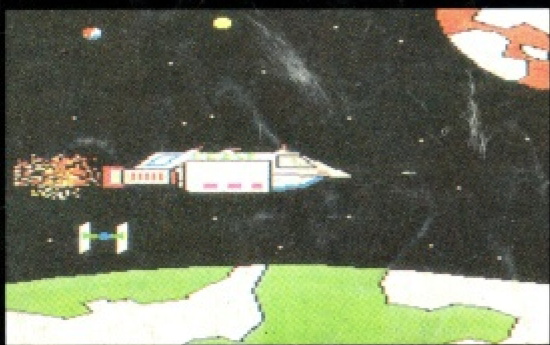
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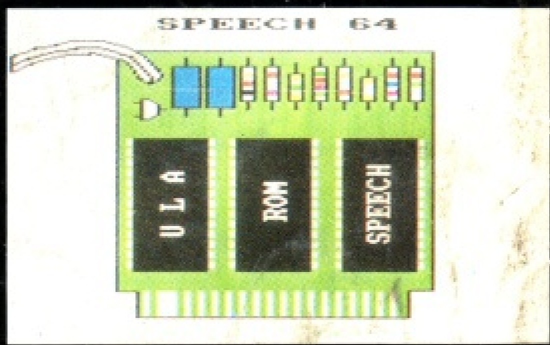
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